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CAD Manual

SPU/SDoT Inter-Departmental CAD Standard



CAD Manual

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Preface

A message from
Ray Hoffman and Peter Hahn

We believe that corporate data is as important and critical of an asset to the City as our physical infrastructure. Managing enterprise-wide corporate data is essential to our mutual success and enhances the data-driven decision-making mode that helps us to manage the City's assets. Creating CADD documents to a common standard puts Seattle Department of Transportation and Seattle Public Utilities in better control of our engineering data.

Over the past year the Inter-Departmental CADD Committee was tasked with updating the existing CADD standards for SPU and SDOT to help both groups remain consistent with industry standards. Thanks to the hard work of a very dedicated joint committee, we now have an improved Inter-Departmental CADD Standard that is endorsed by both SPU and SDOT.

The Inter-Departmental CADD Committee is sanctioned to maintain and update this standard. Each major work unit using AutoCAD and AutoCAD Civil 3D has a representative on the committee. This representative is responsible for disseminating information from the CADD committee to the work unit and is responsible for bringing the concerns and suggestions of the work unit back to the committee for discussion.

Using this Inter-Departmental CADD Standard will make our engineering data compatible with GIS data. It will also make it easier for people in our departments to work effectively together using concurrent engineering principles and allow us to more easily re-use and build on data for future projects, studies, or initiatives. Over time, this effort should help both our departments realize more efficiency for data reuse and as a result help us better control costs in this area.

We both endorse the Inter-Departmental CADD Standard and expect every SDOT and SPU employee or consultant doing CADD work for the City to use this standard and to deliver AutoCAD or AutoCAD Civil 3D compatible files as a final product. If you have any questions regarding this standard, please contact your CADD Committee representative.


Peter Hahn, SDOT Director
Ray Hoffman, SPU Director

Introduction

The SPU/SDoT Inter-Departmental CAD Standard was set in place to ensure that all CAD drafting work performed in house or by a city-hired consultant, could be readily used by various city departments and easily translated into the city's GIS network.

Contract plans result from the work of many specialists and engineers. A base map created by SPU Technical Resources or SDoT Drafters may be used simultaneously by Water Design, Drainage Design, Sewer Design, Roadway Design, Landscaping Design and Electrical Instrumentation Design. All the components of a project - lighting, drainage, paving, sewer and water - fit against the base map, making it possible to compare and complete various design elements in tandem. This ability to work concurrently depends on developing, maintaining and employing CAD standards. The goals of maintaining coherence, minimizing wasted effort in recreating design, and maximizing the effectiveness of a project team are all best served by adhering to the CAD standard.

The current software supported by SPU and SDoT is **AutoCAD Civil 3D 2012**.

The Highlights

Here are some highlights to help you get going quickly.

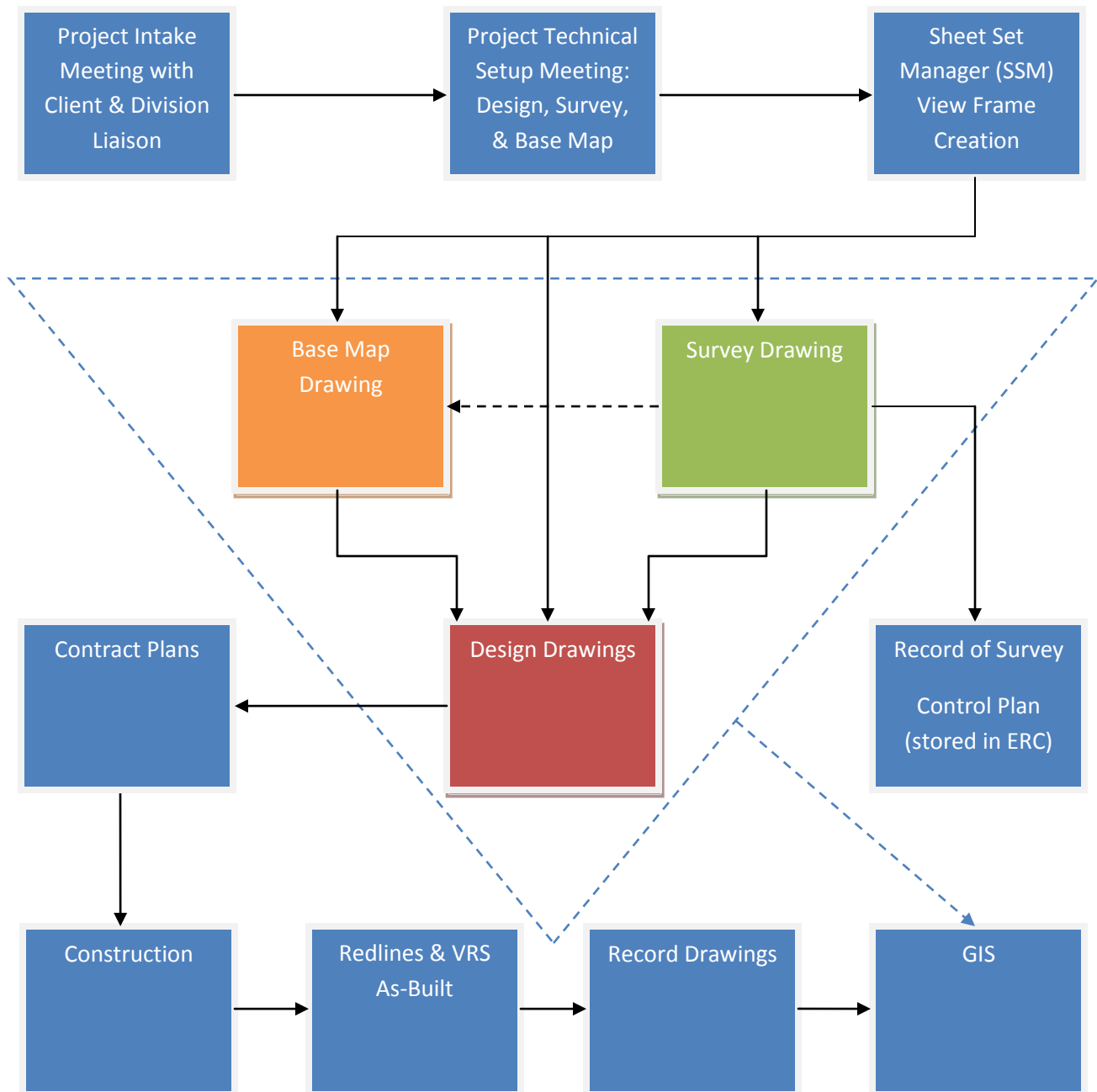
- ✓ **THE SETUP:** For information on downloading templates and supporting files, see page 6.
- ✓ **THE BASICS:** For basic drawing guidelines, see page 21.
- ✓ **FILE NAMING:** Our file-naming conventions are described on pages 18 and 13.
- ✓ **TITLE BLOCKS:** Instructions on setting up title blocks and views start on page 11.
- ✓ **LAYERS:** A list of common layer names is found on page 35.
- ✓ **LINEWORK:** Guidelines for drafting features can be found on page 55.
- ✓ **ANNOTATION:** Text, dimensions, leaders and table settings are found on pages 59-63.
- ✓ **PLOTTING/PRINTING:** Requirements for printing drawings are found on page 64.
- ✓ **FINAL PRODUCT:** A description of the final product is found on page 68.

Definitions of Common Acronyms

COS.....	City of Seattle
SDoT	Seattle Department of Transportation
SPU	Seattle Public Utilities
GIS	Geographic Information System
ERC	Engineering Records Center (Vault)
VPI	Vault Plan Index
VRS	Virtual Reference Station
RE	Resident Engineer
SSM	Sheet Set Manager
XREF	External Reference
DWF.....	Drawing Web Format
PERC	Preliminary Engineering Resource Composite

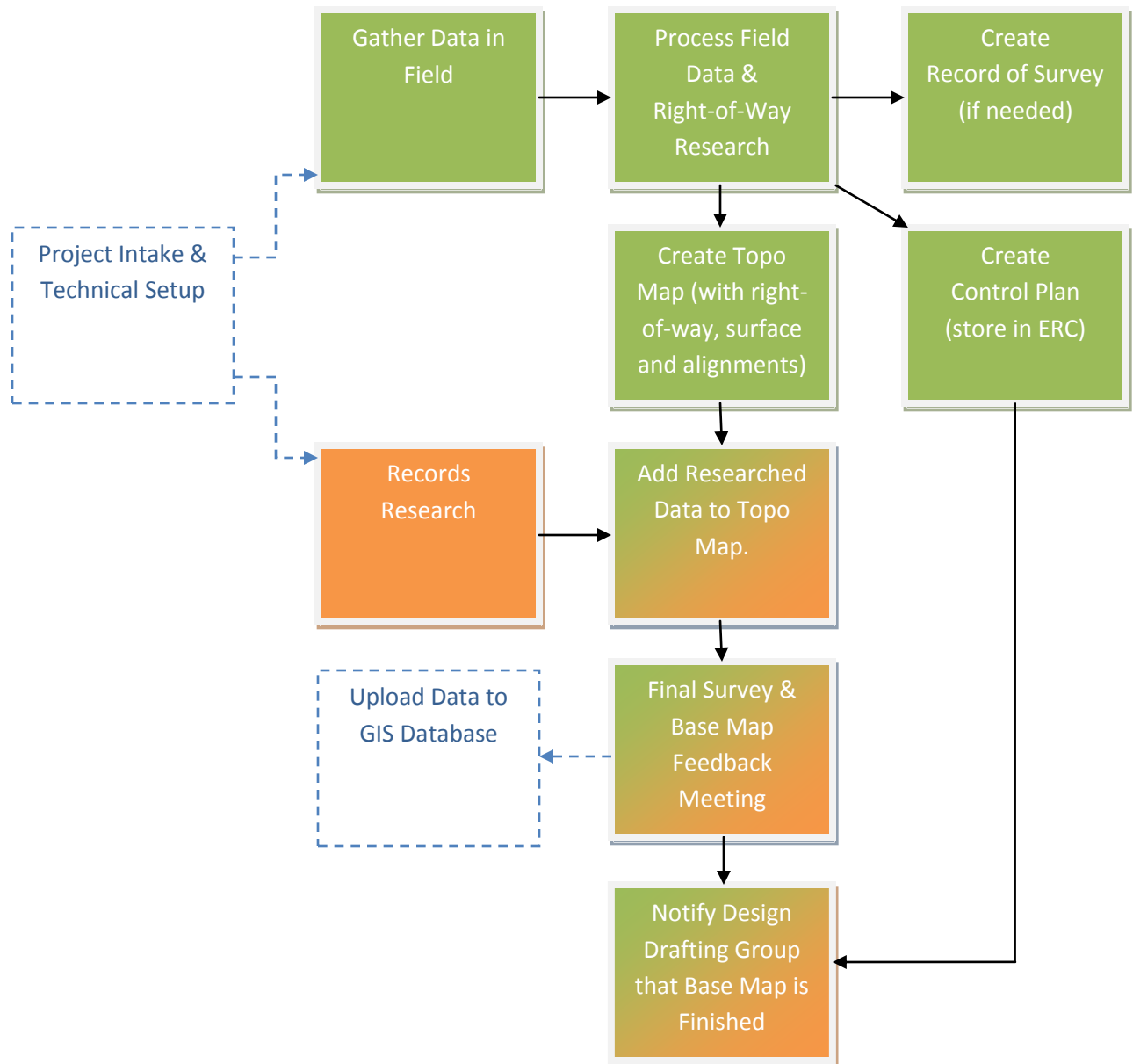
Section 1: Workflow for Civil Projects

The diagram below shows the workflow for typical civil projects.



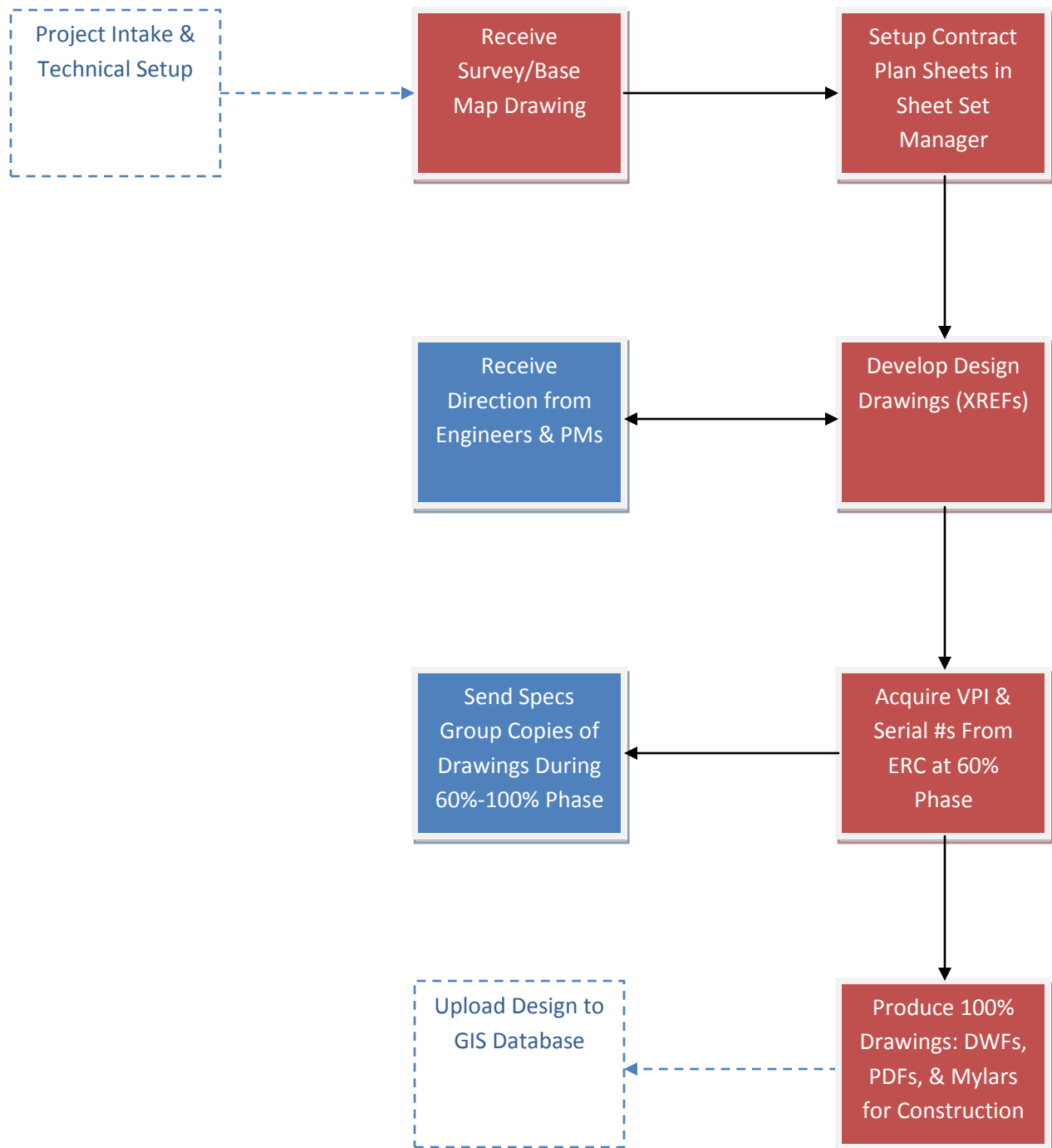
Joint Base Map Creation Workflow

The diagram below shows the typical workflow for the survey and base map groups.



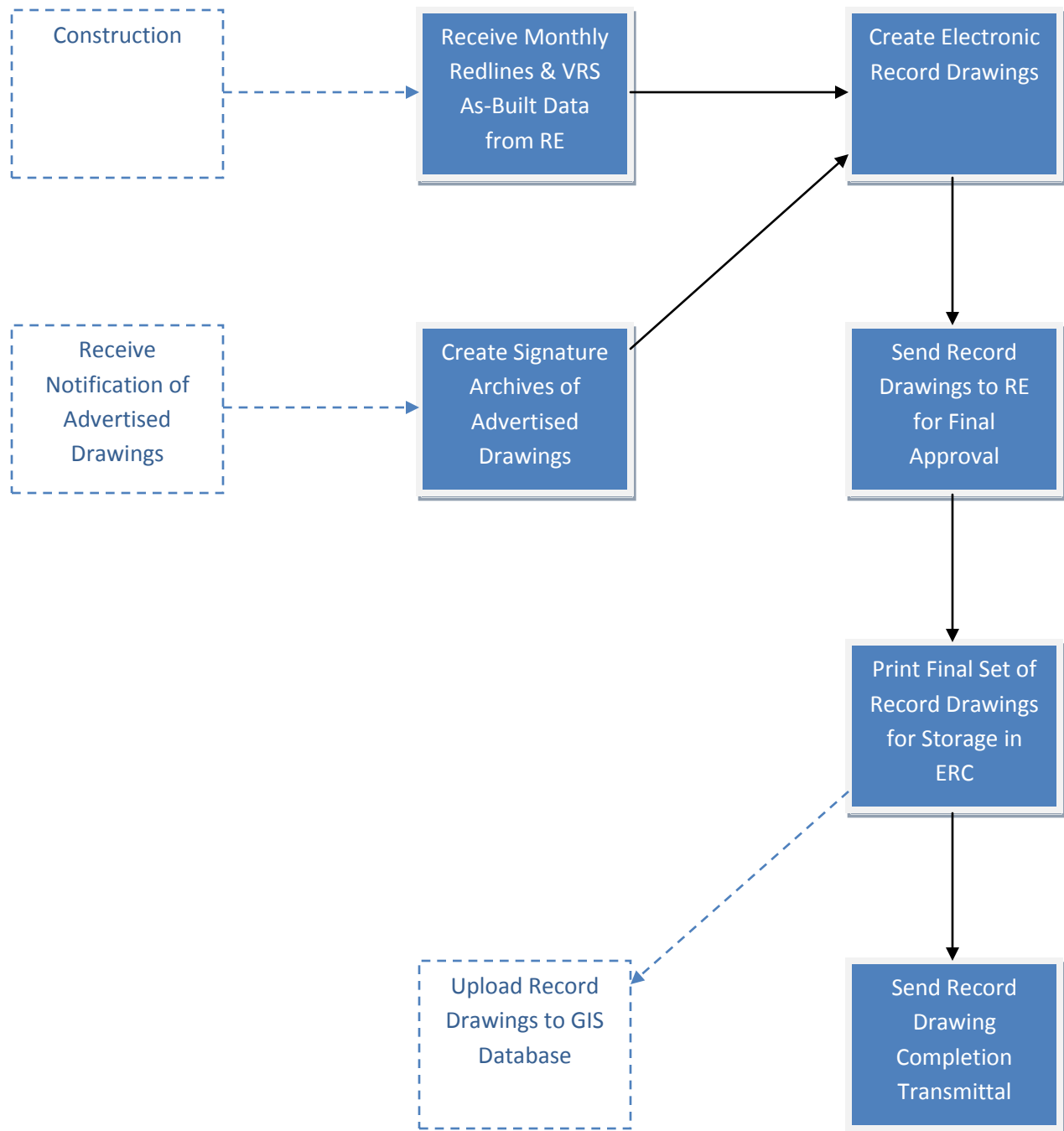
Design Drafting Workflow

The diagram below shows the typical workflow for design drafting group.



Record Drawing Workflow

The diagram below shows the typical workflow for record drawing group.



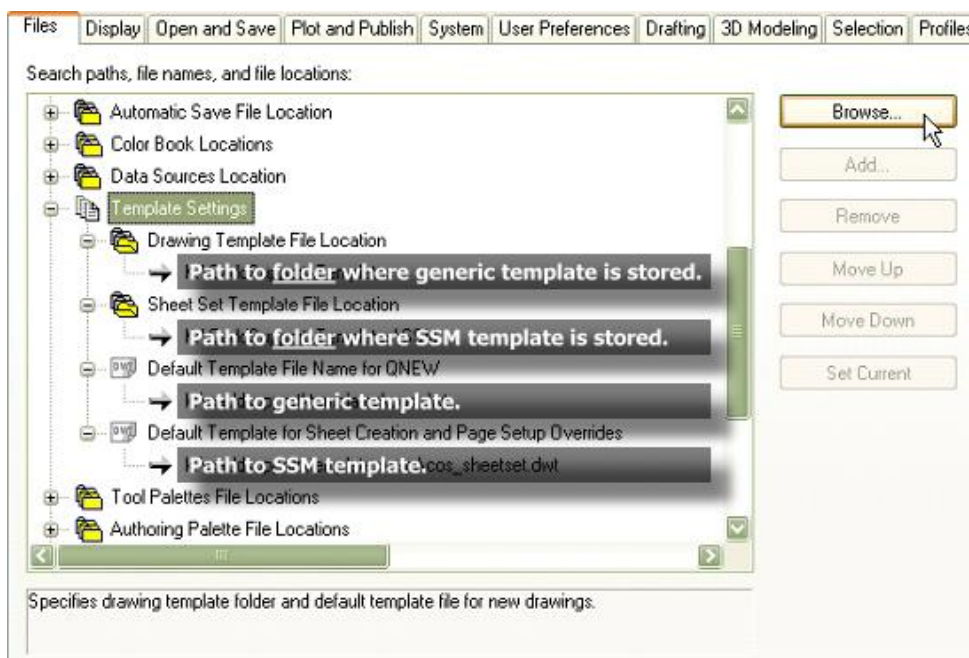
Section 2: Support Files

To download support files, visit http://www.seattle.gov/util/Engineering/CAD_Resources/

We periodically update this web page with the latest documentation (CAD Manual, CAD Manual Appendices and Sample Drawings), templates and support files such as blocks, fonts, linetypes, and more.

Templates

Standard SPU/SDoT Civil 3D templates are available online (see link above). Once you have downloaded the templates, make sure AutoCAD Civil 3D template settings point to where the templates are stored. Type OPTIONS on the command line, click on the “Files” tab, and then expand the “Template Settings” section:



AutoCAD Template

There is a generic AutoCAD template available for download.

AutoCAD Civil 3D Templates

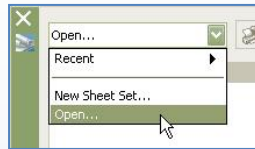
There are two AutoCAD Civil 3D templates available for download; one for surveying/base mapping and one for design drafting. Each template is customized for its unique purpose.

Sheet Set Manager (title block) Template

There is one AutoCAD Civil 3D Sheet Set Manager template (.dwt containing the SPU/SDOT title block) and an accompanying .dst file available for download. **Before you use the Sheet Set Manager template, you will need to make a few changes to the .dwt and .dst files.** Open the .dwt file and modify the page setups to work with your plotters and printers. You will also need to modify the .dst file (see tips on the next couple of pages).

Tip: Setup Sheet Set Manager .dst File Outside the City Network

Before you start using Sheet Set Manager, you need to make a few changes to the .dst file. To do this start up Sheet Set Manager (command: SSM) and open the COS_SheetSet.dst file through SSM.



Right-click on “COS_SheetSet” in SSM and select “Properties...”

Page Setup Overrides File

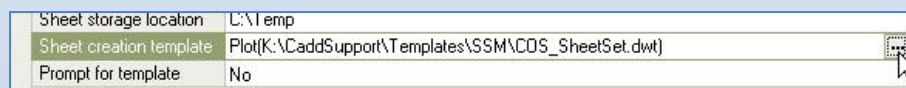
Click the ellipsis (...) button next to the “Page setup overrides file” field .



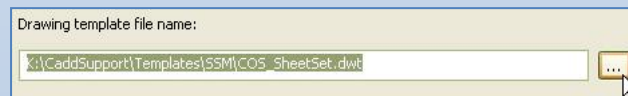
Browse to the location where COS_SheetSet.dwt is stored and click Open.

Sheet Creation Template

Click on the ellipsis (...) button next to the “Sheet creation template” field.



Then click on the ellipsis button in the next dialog box to browse to the location where you stored COS_SheetSet.dwt.



Click Open.

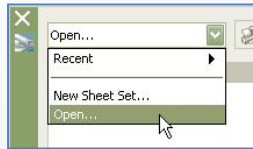
Click OK.

Finally click OK to save and close the Sheet Set Properties.

Tip: Setup Sheet Set Manager Callout Blocks Outside the City Network

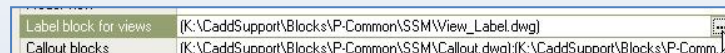
There are callout blocks associated with the City of Seattle SSM template and in order to use them you need to download the blocks and save them in a folder on your network or computer. Once you have done this you will need to tell SSM where to find them.

To do this start up Sheet Set Manager (command: SSM) and open the COS_SheetSet.dst file through SSM.

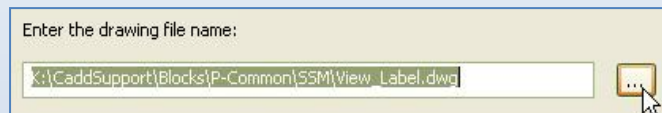


Right-click on “COS_SheetSet” in SSM and select “Properties...”

First click on the ellipsis (...) button next to the “Label block for views” field.

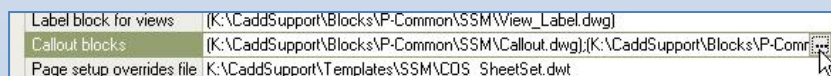


In the resulting dialog box click on the next ellipsis (...) button.



Browse to the folder where you saved the SSM callout blocks and select View_Label.dwg. Click Open. Click OK in the “Select Block” dialog box.

Then select the ellipsis (...) button next to the “Callout blocks” field (see following picture).



You will find a list of paths pointing to blocks. Delete all of them. You will then need to add the folder paths for all the blocks (except the C-View_Label-DB.dwg block) so SSM knows where to find them on your network or computer.

Click the “Add...” button. Then click the ellipsis (...) button in the “Select Block” dialog box. Select a block (not the View_Label.dwg block) and click “Open”. Repeat this for all blocks except the View_Label.dwg block.

Click OK.

Additional Support Files

Here are a few support files available online (see link on page 6).

Pipes Catalog

We provide a pipes catalog as a starting point but it is not required at this time. This catalog does not include standard structure sizes as defined in STANDARD PLAN NO 200. You may model structures in Part Builder based on STANDARD PLAN NO 200 if so desired.

CTBs

Standard printing (see page 64 for more information):

- COS_CADD_Standard.ctb (for printing standard drawings)
- Record_Drawings.ctb (for printing record drawings)

Non-standard printing:

- COS_CADD_Fine-Color.ctb (for printing non-standard figures with fine color lines)
- COS_CADD_Fine-Mono.ctb (for printing non-standard figures with fine black lines)

Fonts

Standard .SHX and .FMP files are available online. To make sure the barcodes on the plan sheets appear correctly, install the **3OF9_NEW.TTF** font natively to your PC.

Linetypes

Standard linetypes that match STANDARD PLAN NO 003 are available online.

Blocks

Standard blocks that match STANDARD PLAN NO 003 are available online.

Object Classification

TR_Object_Classes_for_DD-RD.xml is available online which is used for attaching “Object Data Tables” to 2D utility pipes (“Polylines” and “Multilines”) and structures (blocks). See page 56 for more information.

Section 3: Project Data Sharing

Sharing project data amongst team members is an essential part of concurrent engineering. There are three core elements of AutoCAD that enable drawing/data sharing: Sheet Set Manager, XREFs and Data Referencing.

Key

- [WA #] = Work Authorization Number
- [milestone] = Project percentage milestone
- # = Sheet Number

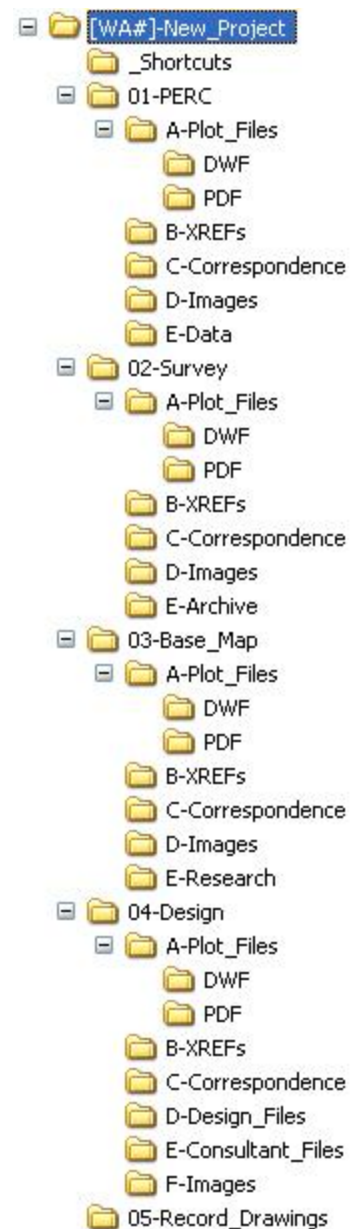
Folder Structure

Having an agreed-upon folder-structure allows all CAD and Survey Technicians to work in one place. All XREFs, Data Shortcuts, and Sheets for the project reside in the same place and are available for all to reference. The parent folder that SPU and SDoT use is: **P:\Project**

Project folders are named in this format: **[WA #]-Project_Name**

Each project folder contains these sub-folders:

- The *_Shortcuts* sub-folder is used to store all data shortcuts for the entire project. This allows all team members to easily reference project data from a central location.
- The *01-PERC* sub-folder is used for storing preliminary-engineering drawings (PERC stands for Preliminary Engineering Resource Composite). The *B-XREFs* sub-folder is used to store the PERC deliverable.
- The *02-Survey* sub-folder is used to store survey drawings. The *A-Plot_Files* sub-folder is used to store the Control Plan sheet set (title block) drawings and the *B-XREFs* sub-folder is used to store the survey deliverable.
- The *03-Base_Map* sub-folder is used to store research information and base map drawings. The *A-Plot_Files* sub-folder is used to store the SDoT SIP base map sheet set (title block) drawings and the *B-XREFs* sub-folder is used to store the base map deliverable.
- The *04-Design* sub-folder is used to store design drawings. Plan and detail drawings are stored in the *B-XREFs* sub-folder while sheet set (title block) drawings are stored in the *A-Plot_Files* sub-folder.
- The *05-Record_Drawings* sub-folder is used to store redlined as-built drawings.

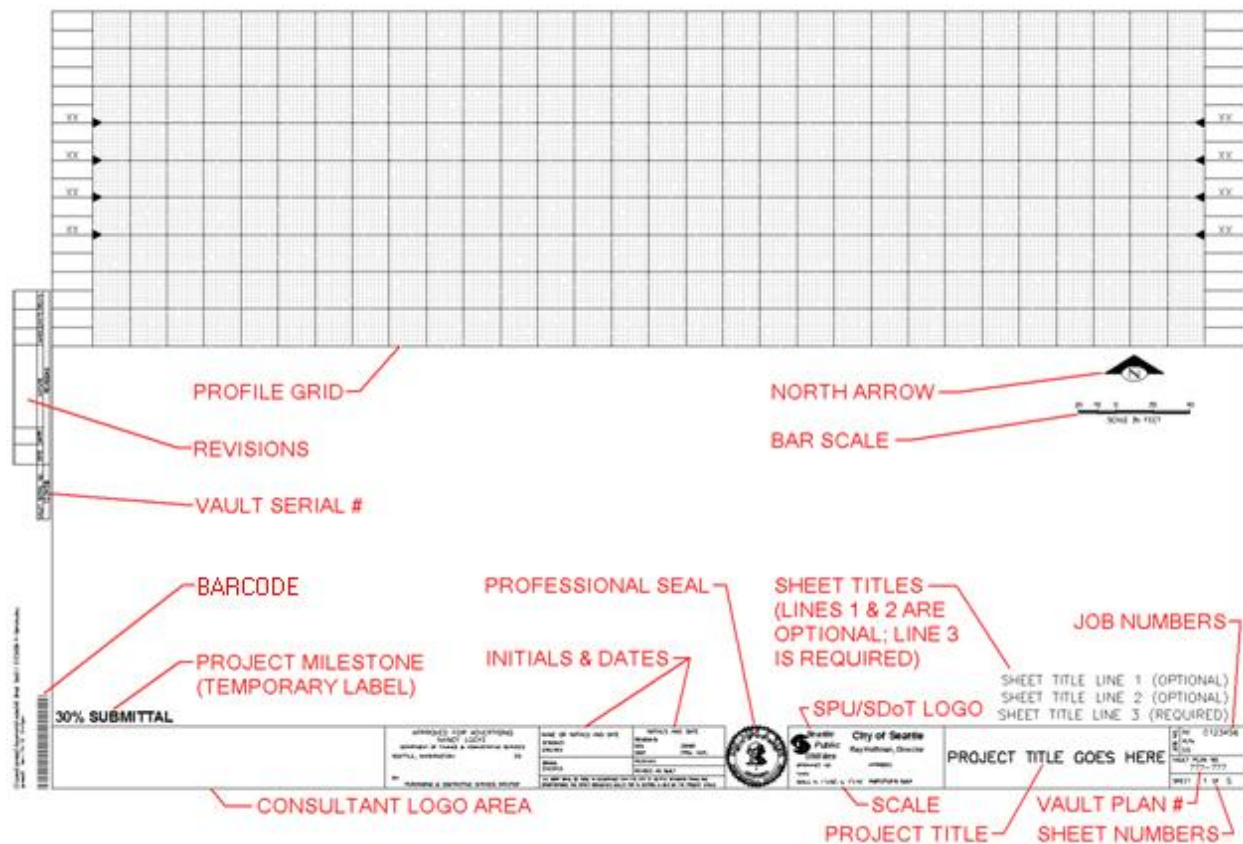


Sheet Set Manager

AutoCAD and Civil 3D have a powerful sheet creation/management tool called Sheet Set Manager (SSM). It leverages the power of fields to make cross-referencing easy and it allows you to print (based on a predefined page setup) selected or all sheets with a simple right-click.

SPU/SDoT Title Block Overview

The SPU/SDoT title block is contained within a template that was specifically designed to be used within Sheet Set Manager. Various fields are editable within the “Sheet Set” (all sheets) and “Sheet” (individual sheet) properties.



Job Numbers (work authorization numbers)

Enter the work authorization number(s) provided by the project manager.

Vault Plan & Serial Number

Vault plan & serial numbers may be acquired in the Engineering Records Center located on the 47th floor of the Seattle Municipal Tower. A cover sheet for the project plan set must be submitted in order to receive the numbers. These numbers are required by the 60% drawing submittal.

Sheet Numbers

Sheet # of # should be shown here. These numbers are linked to the barcode.

Project Title

This space is reserved for the project title only.

Sheet Titles

Lines 1 and 2 are optional; line 3 is required. These fields are embedded within MTEXT so that the text can wrap if needed.

Professional Seal

Insert or XREF professional seal in this location. If multiple seals are needed, they may be stacked above.

Initials & Dates

Initials and dates may be entered here digitally or left blank for hand-written initials and dates upon completion.

Consultant Logo Area

Insert or XREF logo in this location.

Milestone

The project milestone label is meant to be temporary; remove before completion.

Barcode

Every sheet includes a barcode on the lower left corner of the sheet that is automatically generated based on the Vault plan Number and sheet number fields. As a part of an established business process, after the engineering plan sets are signed, they go to the Engineering Records Center (ERC) where they are processed (scanned) into the Virtual Vault, and physically archived.

In order for this barcode to display correctly, you need to download and install the proper font (3OF9_NEW.TTF - see Section 2: Support Files). The barcode utilizes the “3 of 9” barcode format. For more information on the “3 of 9” barcode format, see: http://en.wikipedia.org/wiki/Code_39

Profile Grid

The profile grid block is on layer C-ANNO-GRID and can be turned on and off as needed. The grid block contains elevation attributes. Align the elevations shown in the viewport with the elevations shown on the grid. XREF'd grid line and elevation layers in model space should be set to not print when overlaid through a viewport on this grid block.

More Information on the Title Block

- See page 6 for instructions on setting up the Sheet Set Manager template.
- See page 22 for title block standards.
- For more detailed information on working with Sheet Set Manager see Appendix 6.

Sheet File-Naming Convention

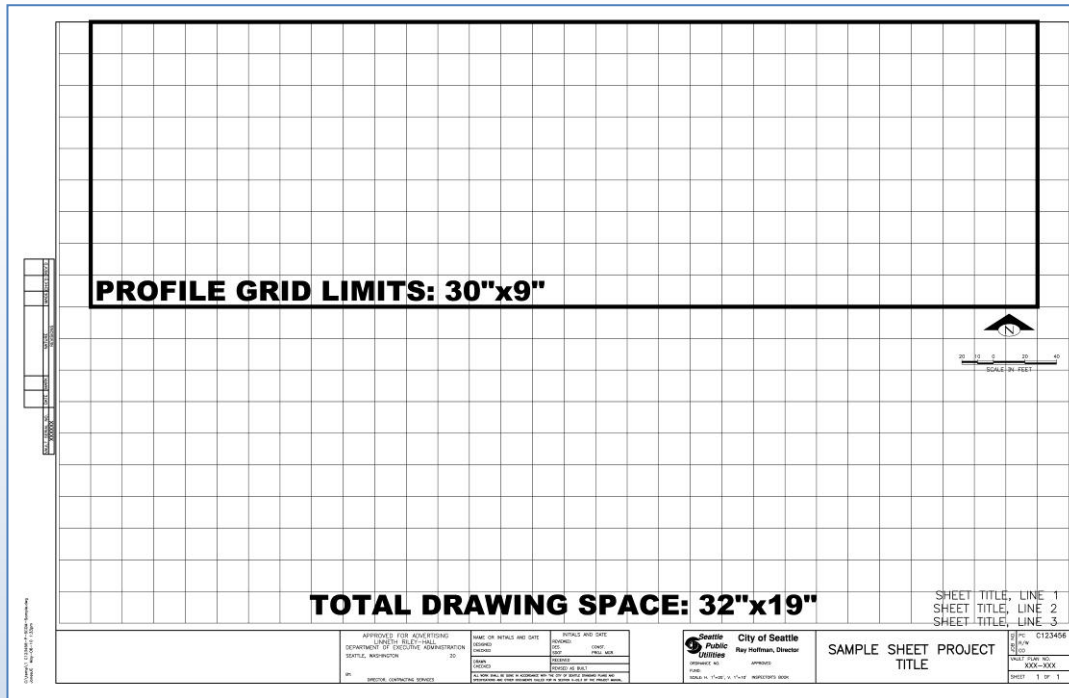
Here is the standard file-naming convention for sheets* (layouts with title blocks). The recommended method for creating sheets is one layout per .DWG file.

• Cover:	# [WA #]-P-Cover-[description].dwg
• Site:	# [WA #]-P-Site-[description].dwg
• Notes:	# [WA #]-P-Notes-[description].dwg
• Water:	# [WA #]-P-WATR-[description].dwg
• Drainage:	# [WA #]-P-STRM-[description].dwg
• Sewer:	# [WA #]-P-SSWR-[description].dwg
• Combined Sewer:	# [WA #]-P-CSWR-[description].dwg
• Water Bodies:	# [WA #]-P-CHAN-[description].dwg
• Rivers and Creeks:	# [WA #]-P-RIVR-[description].dwg
• Ponds:	# [WA #]-P-POND-[description].dwg
• Electrical:	# [WA #]-P-INST-[description].dwg
• Landscape:	# [WA #]-P-VEGE-[description].dwg
• Paving:	# [WA #]-P-ROAD-[description].dwg
• Channelization:	# [WA #]-P-MRKG-[description].dwg
• Traffic Signals:	# [WA #]-P-SIGL-[description].dwg
• Structural:	# [WA #]-P-STRU-[description].dwg
• Details:	# [WA #]-P-DETL-[description].dwg
• Right-of-Way:	# [WA #]-P-RWAY-[description].dwg
• Temporary Erosion & Sediment Control:	# [WA #]-P-EROS-[description].dwg
• Removal:	# [WA #]-P-DEMO-[description].dwg
• Protection:	# [WA #]-P-PROT-[description].dwg
• Irrigation:	# [WA #]-P-IRRG-[description].dwg
• Misc:	# [WA #]-P-MISC-[description].dwg
• Record Drawing:	# [WA #]-P-RDWG-[description].dwg
• SCL Power:	# [WA #]-P-POWR-[description].dwg

*add an R- prefix to record drawings

Tip: Sheet View Planning

It is important to plan your design views to fit inside the SPU/SDoT title block. The total drawing space within the title block is 32"x19". The profile grid takes up 30"x9".



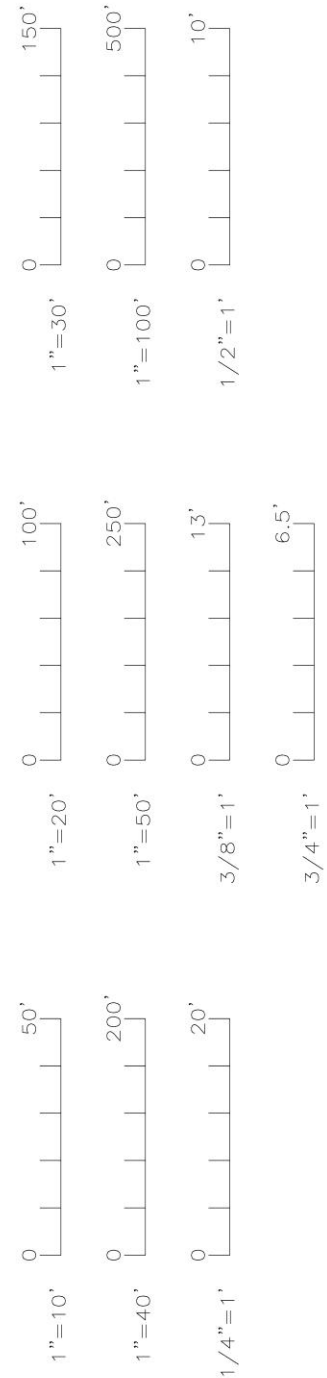
Use the image on the next page as a planning tool to estimate the approximate number of sheets required for a project. This tool allows you to plan drawing views using common engineering and architectural scales. The drawing area in the image reflects useable drawing area of the title block. Inside the drawing area is a grid which contains representations of 1"x1" squares.

EXAMPLE: A graphic component 100 ft. x 40 ft. drawn at a 1"=20' scale would be approximated by counting five squares over and two squares down.

When planning for drawing views make sure to leave about ½ inch space on every side that has a match line and about 1 inch of space under profile views for station labels. Also if a legend or notes will appear on the sheet, leave about 5 inches on the right hand side.

[View Planning Worksheet](#)

20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000 1010 1020 1030 1040 1050 1060 1070 1080 1090 1100 1110 1120 1130 1140 1150 1160 1170 1180 1190 1200 1210 1220 1230 1240 1250 1260 1270 1280 1290 1300 1310 1320 1330 1340 1350 1360 1370 1380 1390 1400 1410 1420 1430 1440 1450 1460 1470 1480 1490 1500 1510 1520 1530 1540 1550 1560 1570 1580 1590 1600 1610 1620 1630 1640 1650 1660 1670 1680 1690 1700 1710 1720 1730 1740 1750 1760 1770 1780 1790 1800 1810 1820 1830 1840 1850 1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100 2110 2120 2130 2140 2150 2160 2170 2180 2190 2200 2210 2220 2230 2240 2250 2260 2270 2280 2290 2300 2310 2320 2330 2340 2350 2360 2370 2380 2390 2400 2410 2420 2430 2440 2450 2460 2470 2480 2490 2500 2510 2520 2530 2540 2550 2560 2570 2580 2590 2600 2610 2620 2630 2640 2650 2660 2670 2680 2690 2700 2710 2720 2730 2740 2750 2760 2770 2780 2790 2800 2810 2820 2830 2840 2850 2860 2870 2880 2890 2900 2910 2920 2930 2940 2950 2960 2970 2980 2990 3000 3010 3020 3030 3040 3050 3060 3070 3080 3090 3100 3110 3120 3130 3140 3150 3160 3170 3180 3190 3200 3210 3220 3230 3240 3250 3260 3270 3280 3290 3300 3310 3320 3330 3340 3350 3360 3370 3380 3390 3400 3410 3420 3430 3440 3450 3460 3470 3480 3490 3500 3510 3520 3530 3540 3550 3560 3570 3580 3590 3600 3610 3620 3630 3640 3650 3660 3670 3680 3690 3700 3710 3720 3730 3740 3750 3760 3770 3780 3790 3800 3810 3820 3830 3840 3850 3860 3870 3880 3890 3900 3910 3920 3930 3940 3950 3960 3970 3980 3990 4000 4010 4020 4030 4040 4050 4060 4070 4080 4090 4100 4110 4120 4130 4140 4150 4160 4170 4180 4190 4200 4210 4220 4230 4240 4250 4260 4270 4280 4290 4300 4310 4320 4330 4340 4350 4360 4370 4380 4390 4400 4410 4420 4430 4440 4450 4460 4470 4480 4490 4500 4510 4520 4530 4540 4550 4560 4570 4580 4590 4600 4610 4620 4630 4640 4650 4660 4670 4680 4690 4700 4710 4720 4730 4740 4750 4760 4770 4780 4790 4800 4810 4820 4830 4840 4850 4860 4870 4880 4890 4900 4910 4920 4930 4940 4950 4960 4970 4980 4990 5000 5010 5020 5030 5040 5050 5060 5070 5080 5090 5100 5110 5120 5130 5140 5150 5160 5170 5180 5190 5200 5210 5220 5230 5240 5250 5260 5270 5280 5290 5300 5310 5320 5330 5340 5350 5360 5370 5380 5390 5400 5410 5420 5430 5440 5450 5460 5470 5480 5490 5500 5510 5520 5530 5540 5550 5560 5570 5580 5590 5600 5610 5620 5630 5640 5650 5660 5670 5680 5690 5700 5710 5720 5730 5740 5750 5760 5770 5780 5790 5800 5810 5820 5830 5840 5850 5860 5870 5880 5890 5900 5910 5920 5930 5940 5950 5960 5970 5980 5990 6000 6010 6020 6030 6040 6050 6060 6070 6080 6090 6100 6110 6120 6130 6140 6150 6160 6170 6180 6190 6200 6210 6220 6230 6240 6250 6260 6270 6280 6290 6300 6310 6320 6330 6340 6350 6360 6370 6380 6390 6400 6410 6420 6430 6440 6450 6460 6470 6480 6490 6500 6510 6520 6530 6540 6550 6560 6570 6580 6590 6600 6610 6620 6630 6640 6650 6660 6670 6680 6690 6700 6710 6720 6730 6740 6750 6760 6770 6780 6790 6800 6810 6820 6830 6840 6850 6860 6870



XREFs

External Referencing, or XREF'ing, has been a standard procedure for concurrent engineering for a long time. The survey and base map drawings should be XREF'd into design drawings as a basis for the design. Every design discipline (plan view) should be a separate XREF drawing. Sheet drawings (paper-space layouts) should XREF the survey/base map and design drawings into model-space and display all or a portion of the composite plan view with viewports.

The XREF type should always be "Overlay".

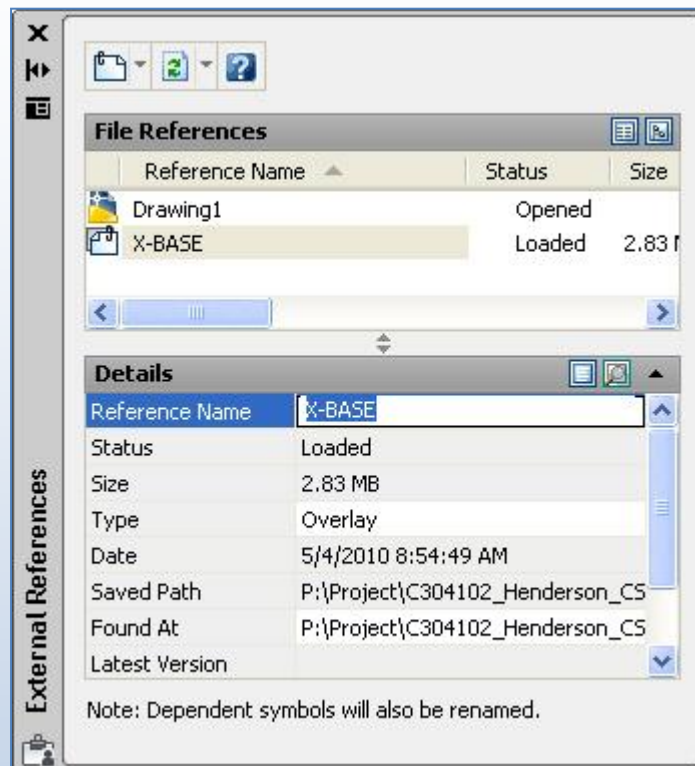
XREF Aliases

An XREF "Alias" is also known as an XREF "Reference Name"; the layer prefix (followed by the | symbol) for the XREF layers. This allows users to easily filter layers based on individual XREF names (or aliases) using Layer Filters and Layer States.

• Survey:	X-TOPO
• Right-of-Way:	X-RWAY
• Base Map:	X-BASE
• Water Design:	X-WATR
• Drainage Design:	X-STRM
• Sewer Design:	X-SSWR
• Combined Sewer Design:	X-CSWR
• Major Water Body Design:	X-CHAN
• River and Creek Design:	X-RIVR
• Pond Design:	X-POND
• Electrical Instrumentation Design:	X-INST
• Landscape Design:	X-VEGE
• Paving Design:	X-ROAD
• Channelization Design:	X-MRKG
• Traffic Signals Design:	X-SIGL
• Structural Design:	X-STRU
• Details:	X-DETL
• Temporary Erosion & Sediment Control:	X-EROS
• Removal:	X-DEMO
• Protection:	X-PROT
• Irrigation:	X-IRRG
• Views:	X-VIEW
• Miscellaneous:	X-MISC
• Record Drawing:	X-RDWG
• SCL Power Design:	X-POWR
• Grading:	X-GRAD
• Site:	X-SITE

Tip: How to Modify an XREF “Alias”

In the External References (XREF) palette you can edit the “Reference Name” (in the “Details” section of the palette) for each XREF.



The XREF layers will then look like this:

```
X-BASE|RU-SSWR-ANNO
X-BASE|RU-SSWR-LATL
X-BASE|RU-SSWR-MHOL
X-BASE|RU-SSWR-PIPE-LRGE
X-BASE|RU-SSWR-PIPE-SMAL
X-BASE|RU-SSWR-STRC
```

XREF File Naming Convention

• Survey:	[WA #]-X-TOPO-[optional_description].dwg
• Right-of-Way:	[WA #]-X-RWAY-[optional_description].dwg
• Base Map:	[WA #]-X-BASE-[optional_description].dwg
• Water Design:	[WA #]-X-WATR-[optional_description].dwg
• Drainage Design:	[WA #]-X-STRM-[optional_description].dwg
• Sewer Design:	[WA #]-X-SSWR-[optional_description].dwg
• Combined Sewer Design:	[WA #]-X-CSWR-[optional_description].dwg
• Major Water Body Design:	[WA #]-X-CHAN-[optional_description].dwg
• River and Creek Design:	[WA #]-X-RIVR-[optional_description].dwg
• Pond Design:	[WA #]-X-POND-[optional_description].dwg
• Electrical Instrumentation Design:	[WA #]-X-INST-[optional_description].dwg
• Landscape Design:	[WA #]-X-VEGE-[optional_description].dwg
• Paving Design:	[WA #]-X-ROAD-[optional_description].dwg
• Channelization Design:	[WA #]-X-MRKG-[optional_description].dwg
• Traffic Signals Design:	[WA #]-X-SIGL-[optional_description].dwg
• Structural Design:	[WA #]-X-STRU-[optional_description].dwg
• Details:	[WA #]-X-DETL-[optional_description].dwg
• Temporary Erosion & Sediment Control:	[WA #]-X-EROS-[optional_description].dwg
• Removal:	[WA #]-X-DEMO-[optional_description].dwg
• Protection:	[WA #]-X-PROT-[optional_description].dwg
• Irrigation:	[WA #]-X-IRRG-[optional_description].dwg
• Views:	[WA #]-X-VIEW-[optional_description].dwg
• Miscellaneous:	[WA #]-X-MISC-[optional_description].dwg
• Record Drawing:	[WA #]-X-RDWG-[optional_description].dwg
• SCL Power Design:	[WA #]-X-POWR-[optional_description].dwg
• Grading:	[WA #]-X-GRAD-[optional_description].dwg
• Site:	[WA #]-X-SITE-[optional_description].dwg

View Naming

Because we are using Sheet Set Manager, it is crucial to create named views (command: VIEW) in XREF drawings (model space). View names should reflect the exact title of the drawing view or detail. For example, an “air valve vault detail” view should be named, AIR VALVE VAULT DETAIL. AutoCAD’s view manager, however, will not allow certain “special characters” in named views (such as <> \ / " ' ; * , =) but there is a workaround. Here are %% codes to use in place of these special characters:

%%60 = <	%%39 = '	%%44 = ,
%%62 = >	%%34 = "	%%63 = ?
%%47 = /	%%58 = :	%%42 = *
%%92 = \	%%59 = ;	%%61 = =

Tip: Create a Named View

To create a model space view, type VIEW on the command line and click the “New...” button in the View Manager dialog box.

Type the view name using the %% codes if necessary. For example, if the title of the view is **24" BFV DETAIL** you should type **24%%34 BFV DETAIL** in the View Name field.

The screenshot shows the 'View Manager' dialog box with the 'View Properties' tab selected. The 'View name' field contains the text '24%%34 BFV DETAIL'. The 'View category' dropdown is set to '<None>' and the 'View type' dropdown is set to 'Still'. Below these, there are two tabs: 'View Properties' and 'Shot Properties'. Under 'View Properties', there is a 'Boundary' section with two radio buttons: 'Current display' (unselected) and 'Define window' (selected). To the right of these radio buttons is a small icon of a window with a red 'X' and a cursor. Below the 'Boundary' section is a 'Settings' section with a checkbox labeled 'Save layer snapshot with view', which is currently unchecked.

Data Shortcuts and Data Referencing

Civil 3D has a tool called *Data Shortcuts* which allows you to share project data. Here is a list of the types of data that can be shared using Data Shortcuts:

- Surfaces
- Profiles
- View Frame Groups
- Pipe Networks
- Alignments

Terminology:

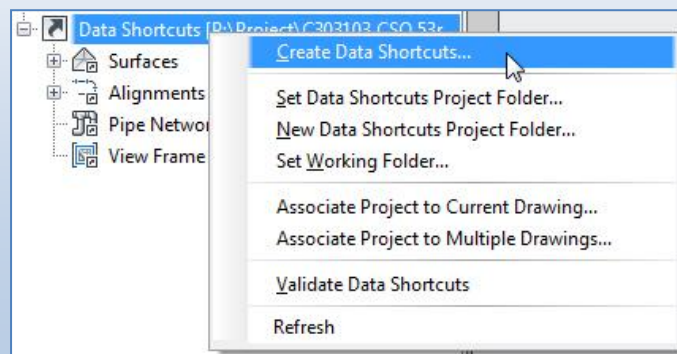
- **Create Data Shortcut:** Share the Civil 3D data with others (publish XML to *_Shortcuts* folder).
- **Create Reference:** Bring shared Civil 3D data into your drawing.

One person can create a data shortcut of data they have created and another person can create a reference to that shared data.

For example, the survey group will *create data shortcuts* of alignments and existing ground surfaces and the base map group *create data shortcuts* of pipe networks. The design group will XREF base map, freeze the alignment, surface, and pipe layers, and *create data references* of the alignments, existing ground surfaces, and pipe networks to use as the basis for the design.

Tip: Create Data Shortcuts in Civil 3D 2012

1. In the Prospector tab of Toolspace (command: SHOWTS), right-click on “Data Shortcuts” and click “Set Working Folder...” Set it to **P:\Project**
2. In the Prospector tab of Toolspace, right-click on “Data Shortcuts” and click “Set Data Shortcuts Project Folder...” Select your project name.
3. In the Prospector tab of Toolspace, right-click on “Data Shortcuts” and click “Create Data Shortcuts...” Select the items for which you want to create shortcuts and hit OK.



Section 4: Drawing Guidelines

Overview

Every drawing should be in the world UCS with the 0,0 point defined by Survey in the Survey drawing. It is important to maintain an accurate coordinate system in order to allow the exchange of design information amongst the project team and allow information from different design groups to be displayed together easily. Each design drawing should be in model space (with nothing in paper space) and should have no other drawing files externally referenced (XREF'd) into it. As you are working on your drawing, you will have the base and other design drawings externally referenced during your drawing session, but when you are complete, it is important to unload all XREFs.

General Drafting Guidelines

- ☐ Do not draw on layer 0
- ☐ Create the design in model space at 1 drawing unit = 1 ft
- ☐ Create each design element/discipline as a separate file (XREF)
- ☐ Create files in the appropriate folders, giving each file an appropriate name (see Section 3: Project Data Sharing)
- ☐ XREF in (as overlays) the survey/base map drawing and other needed design files as required on appropriate layers
- ☐ Work in the correct horizontal & vertical coordinate systems (for example NAVD83/91 and NAVD88, or as defined by survey)
- ☐ Draft at Z = 0, design at Z = true elevation
- ☐ Use standard COS layers, colors and linetypes (see Section 5: Layers)
- ☐ Features should be drawn in accordance with STANDARD PLAN NO 003 (see Section 6: Linework)
- ☐ Use standard COS blocks (see Section 2: Support Files)
- ☐ Use standard COS text styles and text heights (see Section 7: Annotation)
- ☐ Abbreviations should be shown in accordance with STANDARD PLAN NO 002
- ☐ Lettering should not be shown to identify features for which standard symbols are used, unless lettering is shown in the standard symbols
- ☐ Plot with COS color table (see Section 8: Plotting/Printing)

Plan Presentation Standards Checklist

Sample drawings are available for download on the web (see Section 2: Support Files).

Title Blocks

The SPU/SDoT Sheet Set Manager template should be used to create title block drawings (see page 6 for more information on downloading and setting up the SPU/SDoT Sheet Set Manager template).

Title blocks should contain the following:

- ☐ Project title
- ☐ Sheet numbers (sheet # of #)
- ☐ Job numbers (work authorization numbers)
- ☐ Vault plan number
- ☐ Vault serial number
- ☐ Sheet titles
- ☐ Designer's professional stamp (stamp must be signed if plans are complete)
- ☐ Designer, drafter and checker initials
- ☐ Scale (horizontal and vertical if applicable; for example: H. 1" = 20', V. 1" = 10'). If drawing has no scale, write NONE. If drawing has various scales, write AS NOTED in title block and write the scales under the view titles.

NOTE: Do not explode title blocks or overwrite fields with text. To add something to the title block (such as a company logo or professional engineer's seal) XREF or insert a drawing into the layouts).

Cover Sheet

The cover sheet should be sheet #1 and contain the following:

- ☐ Vicinity map at scale: 1" = 1 MILE
- ☐ Datum block
 - ☐ Vertical datum note, including:
 - ☐ Benchmark reference number, description (including location), and elevation
 - ☐ Datum name (must be NAVD88 for all plans first submitted after 1/1/2004. Use of an alternative datum is permitted only with permission from SPU Survey Manager.)
 - ☐ Horizontal datum note, including:
 - ☐ Basis of bearing description
 - ☐ Description of monuments used for basis of bearing
 - ☐ Coordinates on each monument used for basis of bearing
 - ☐ Bearing and distance between the two monuments
 - ☐ Source of coordinates (Published, GPS, or what?)
- ☐ Detail & section referencing block
- ☐ Location map (may go on another sheet if more room is required) at scale: 1" = 400'
- ☐ Sheet index (may go on another sheet if more room is required)
- ☐ Notes (may go on another sheet if more room is required)

Survey Control Guidelines

Survey control information should be included in every plan set. The survey control information may be included on the location map or may be shown on it's own sheet. The survey control information sheet must include:

- ☐ North arrow pointing up or to the left.
- ☐ Street names.
- ☐ Description of every monument (cased, buried, surface brass cap, etc.).
- ☐ Coordinates for each monument, which must include Northing and Easting (elevations are optional).
- ☐ Bearing and distance on each street between each two monuments, and distance from offset monument (if any) to intersection.
- ☐ Radius, delta angle, and arc length on any curving monument lines or baselines.
- ☐ Bearing and distance and/or dimension from monumented line to construction baselines (if any).
- ☐ Station numbering must be unique for each street. Come up with different starting stations so that the numbers do not overlap.
- ☐ Stationing on North/South alignments must increase to the South to abide by city presentation standard of north up or left. Stationing on East/West alignments must increase to the East to abide by city presentation standard of north up or left.
- ☐ Station at the beginning, end, at each intersection and at PCs and PTs of curving monument lines (no stationing that starts at property line, end of existing paving, or other indeterminate point).
- ☐ Description and elevation of any site BMs or control points with elevation (it is ok to use monuments with elevations as site BMs).
- ☐ Dimension from monument line to right-of-way line on each street; if variable, show dimension at each end of block.
- ☐ Licensed surveyor's stamp (stamp must be signed if plans are complete).
- ☐ Current contact information for the surveyor whose stamp appears on the drawing (name, address, phone, and/or email).

General Plan & Profile Sheet Guidelines

- ☐ Profile views are shown above plan views. The plan and profile views should be aligned so that the improvement is in direct relationship between the two views as much as possible.
- ☐ Street names must be shown (see Section 7: Annotation).
- ☐ Adjoining sheets must use match lines at an even station with the sheet number referenced.
- ☐ All disciplines (paving plans, watermain plans, sewer plans, etc.) should use the same matchline locations.
- ☐ Dimensioning between features shown on separate sheets should be shown with double arrowheads at the match line.
- ☐ The scale must not change across match lines.
- ☐ Plan views should have a North arrow with a bar scale under it.
- ☐ North should be shown up or to-the-left as a general rule.
- ☐ For multi-discipline projects, sheets may show nearby improvements for context (such as showing water improvements on a drainage plan) but the annotation must be frozen and the linework must be set to color 145.
- ☐ Use standard COS detail and section referencing callouts (for info see Appendix 6).

Tip: Viewport Layer Color Overrides

It is important to use standard layer colors, but there is one instance when a color override is appropriate: showing a nearby improvement along with the main improvement on a sheet (such as showing water improvements on a drainage plan).

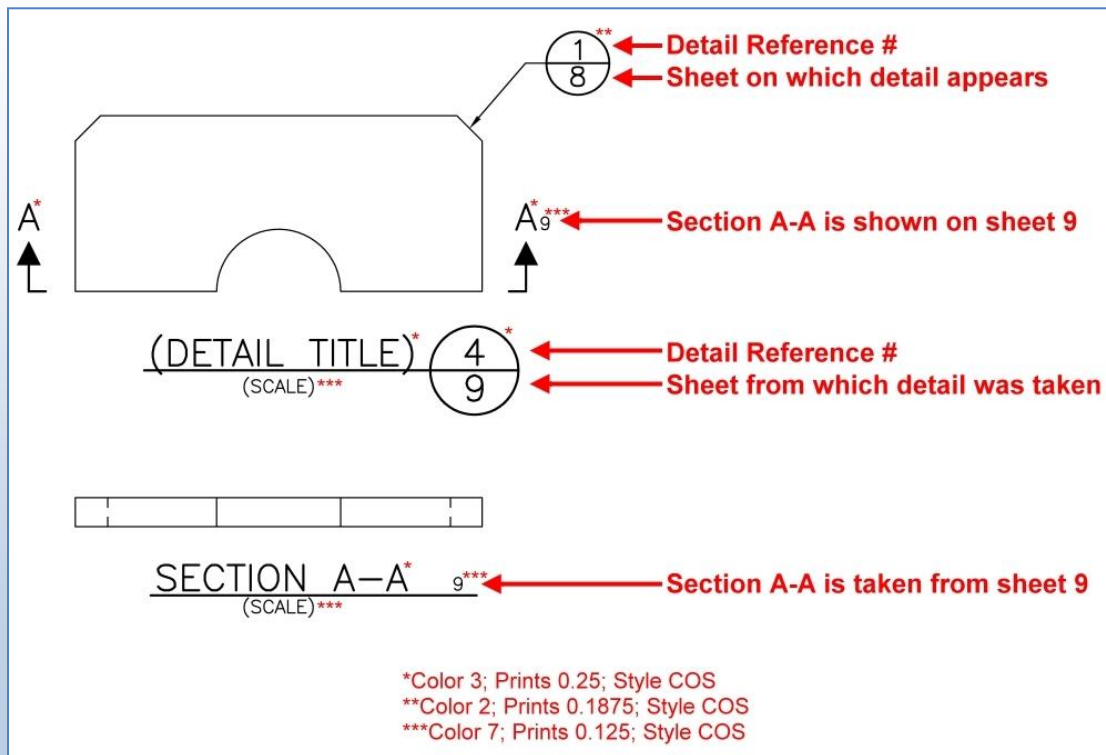
To do this, overlay an XREF of the secondary improvement, viewport freeze (VP Freeze) secondary improvement layers that don't need to be shown (such as annotation) and change the viewport color (VP Color) of the remaining secondary improvement layers to color 145.

Detail & Section Guidelines

- ❑ Details should be labeled with a title, scale centered under the title and reference numbers in a bubble callout to the right of the title.
- ❑ Sections should be labeled with a letter designation in this format: SECTION X-X # (sheet reference is shown to the right of the title) and scale centered underneath.
- ❑ Detail and section viewports should be arranged and numbered/lettered in order to be read from left-to-right/top-to-bottom.

Tip: Detail & Section Referencing Standards

Detail and section view titles should be center-justified over the scale.



Paving Plan View Guidelines

- ☐ Station and offset (or station and pavement width) from monument line or construction baseline to:
 - ☐ all beginnings and ends of curb and/or “match existing” points
 - ☐ all curb PC’s, PT’s, PRC’s, angle points, and changes of curb height. If wheel-chair ramps are involved project top of curb elevations through ramp area
 - ☐ delta angle on all curb returns, and radius on all curb returns and reverse curves (curve information may be shown in a table or detail if desired).
- ☐ Elevations at quarter points of curb returns (curve information may be shown in a table or detail if desired).
- ☐ Radius on all reverse curves (curve information may be shown in a table or detail if desired).

Paving Profile View Guidelines

- ☐ Call out whether the profile refers to the centerline of road, top of curb, gutter/flow line, or other feature.
- ☐ Show elevations at all grade breaks.
- ☐ Show elevations at all “match existing” points.
- ☐ Provide a description of any vertical curves (required for grade changes greater than 1%). The description must include:
 - ☐ VPI station and elevation
 - ☐ Length of vertical curve (min along streets is 75’)
 - ☐ High or low point station and elevation, if applicable

Paving Cross Section View Guidelines

- ☐ Dimension from centerline to saw cut, flow line (if other than base of curb), face of curb, sidewalk and sidewalk width, and right-of-way line.
- ☐ Show height of curb or dimensions of thickened edge of asphalt
- ☐ Show cross slope on all paved surfaces

Sewer, Storm Drain, and Water Main Plan View Guidelines

- ☐ Scale should be 1” = 20’ or 1” = 10’.
- ☐ Station and offset from monument line or construction baseline to:
 - ☐ all structures (maintenance holes, cleanouts, catch basins, inlets, hydrants, valves, etc.)
 - ☐ all horizontal break points and all connection points
- ☐ Size and material of each pipe

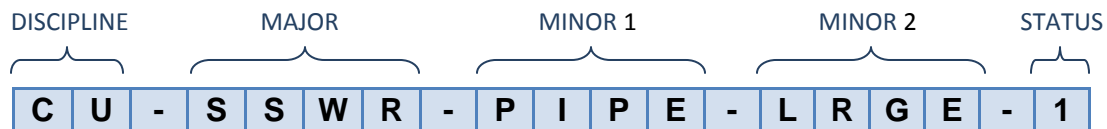
Sewer, Storm Drain, and Water Main Profile View Guidelines

- ☐ Horizontal scale should match associated plan view scale. Vertical scales may vary.
- ☐ Pipe profiles are required for all sewer, storm drain, and water mains. Pipe profiles must include:
 - ☐ Identification of each structure
 - ☐ Elevation at rim of each structure
 - ☐ Elevations at each invert, connection, and/or grade break on each pipe
 - ☐ Gravity pipes must be labeled with size, material, length and slope of each pipe run
- ☐ Radius and delta angle of curved pipes, if applicable

Section 5: Layers

The layer name format is organized as a hierarchy. This arrangement allows users to select from a number of options for naming layers according to the level of detailed information desired. Layer names consist of distinct data fields separated from one another by dashes. A detailed list of abbreviations, or field codes, is prescribed to define the content of layers. Most field codes are mnemonic English abbreviations of construction terminology that are easy to remember.

The layer name format, showing the Discipline Designator, the Major Group, two Minor Groups (optional), and the Status (optional) fields looks like this:



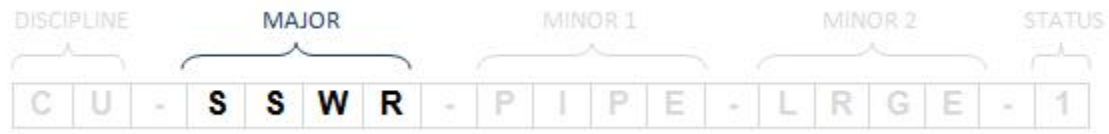
Here are lists of common layer fields (not all field codes are represented here):

Layer Fields: Discipline Designators



Designator:	Description:
V	Survey (verified as-builts)
VA	Aerial Survey
VF	Construction Field Survey
VJ	Calculated Survey
R	Base Map (based on existing records)
RE	Base Map Electrical Instrumentation
RP	Base Map Paving
RU	Base Map Utilities
C	Civil (proposed)
CD	Civil Demolition
CS	Civil Site
CU	Civil Utilities
CP	Civil Paving
CG	Civil Grading
CT	Civil Transportation
CR	Civil Record Drawing
EI	Electrical Instrumentation (proposed)
L	Landscaping (proposed)
S	Structural (proposed)

Layer Fields: Major Group



Abbrev:	Description:
ALIN	Alignments
ANNO	Sheet annotation
BLDG	Buildings and primary structures
BLIN	Baseline
BNDY	Political Boundaries
BORE	Test borings
BRDG	Bridges
BRKL	Break / fault lines
CABL	Cable
CHAN	Water bodies (channels, lakes & the Puget Sound)
COMM	Communications
CSWR	Combined sewers
CTRL	Control points
DATA	Data outlets
DETL	Details
DIAG	Diagrams
DRIV	Driveways
DTCH	Ditches or washes
EROS	TESC (temporary erosion and sediment control)
ESMT	Easements
FNDN	Foundations
FENC	Fencing
FIRE	Fire protection system
FLHA	Flood hazard area
FUEL	Fuel gas
GRND	Ground systems
INTR	Interference
IRRG	Irrigation
LITE	Light poles
LOCN	Limits of construction
MATL	Material section
NODE	Point
NGAS	Natural gas
PIPE	Pipes
PLNT	Plant and landscape material
POND	Ponds
POWR	Power (Seattle City Light)

Abbrev:	Description:
PRKG	Parking
PROF	Profiles
PROP	Property
PVMT	Pavement (non-roadway paving, i.e. conc pads)
RAIL	Railway
RBAR	Rebar
RIVR	Rivers and Creeks
ROAD	Roadways
ROCK	Rocks and Rockery
RRAP	Riprap
RWAY	Right-of-Way
SECT	Sections
SGHT	Sight distance
SITE	Site features
SOIL	Soils
SURV	Survey
SSWR	Sanitary sewer
STEM	Steam
STRM	Storm sewer
SWLK	Sidewalks
TINN	Triangulated irregular network
TOPO	Topography
TRAL	Trails or paths
VIEW	Viewports
WALL	Walls
WATR	Water supply systems
WETL	Wetlands
WTZN	Water pressure zone

Layer Fields: Minor Group



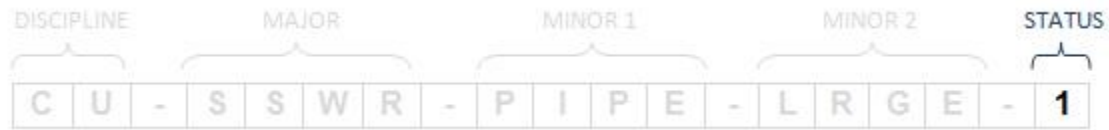
Abbrev:	Description:
025Y	Flood: 25 year mark
050Y	Flood: 50 year mark
100Y	Flood: 100 year mark
200Y	Flood: 200 year mark
ACCS	Easements: Access (pedestrian only)
ANNO	Annotation
ASPH	Pavement: Asphalt
ASSM	Corridors: Assemblies
BACK	Pavement: Back
BARR	Barriers (jersey barriers, noise barriers, etc.)
BARS	Sheets: Bar scales
BIKE	Bike racks
BNCH	Benches
BNDY	Topography: Boundaries (surface boundaries)
BOTD	Ditches: Bottom of ditch
BRCK	Brick
BRNG	Annotation, Alignments: Bearing and distance (survey coordinates)
BUFF	Wetlands: Buffers
CATV	Utilities: Cable television
CIPR	TESC: Culvert inlet protection
CITY	City Boundaries
CNTY	County Boundaries
CNTE	TESC: Drainage divides
CNTR	All: Center lines
COLS	Columns
CON1	Details: Thick construction lines
CON2	Details: Thin construction lines
CONC	Pavement: Concrete
CONS	Easements: Conservation
CORR	Corridors
CSTG	Easements: Construction / grading
CTLJ	Walls: Control joints
CURB	Pavement: Curbs
DAYL	Grading: Daylight lines
DECK	Buildings: Outdoor decks (no roof)
DEPR	Topography: Depression (depression contours)
DIMS	Dimensions

Abbrev:	Description:
DRAN	Grading: Drainage slope
DVDK	TESC: Diversion dike
EDGE	Channels, major water bodies, ponds, creeks and rivers: edge of water
EGND	Profiles: Existing ground
ELEC	Utilities: Electrical
EQPM	Utilities: Equipment (pumps, motors, etc.)
EWAT	Ditches: Edge of water
FACE	Pavement: Face (front)
FALT	Topography: Fault / break lines
FDPL	Flood plain
FEAT	Grading: Feature lines
FGND	Profiles: Finish ground
FIBR	Fiber Optic
FIXT	All: Fixtures (wheel stops, parking meters, hardware, etc.)
FLNE	Channelization: Fire lane
FRME	Sheets: Frame
GRAL	Fencing: Guard rails
GRID	Profiles: Profile grid
GRVL	Pavement: Gravel
GZON	Channelization: green bike zone
HID1	Details: Thick hidden lines
HID2	Details: Thin hidden lines
HRAL	Handrail
HTCH	All: Hatch
HYDR	Water: Fire hydrants
IMGS	Images and photos
INEG	Easements: Ingress / egress (vehicles only)
INPR	TESC: Inlet protection
INST	Utilities/Electrical: Instrumentation (meters, valves, traffic signal hardware, electrical, etc.)
INTR	Misc: Interference
KEYN	Sheets: Keynotes
LABL	Annotation: Labels
LATL	Utilities: Laterals (sewer & drainage connections)
LEGN	Sheets: Legends, symbol keys
LANE	Channelization: lane
LIDR	LIDAR Data
LINE	All: Lines (property lines, etc.)
LOGS	Logs
LOOP	Traffic: Loops
LRGE	Utilities: Large piping (>= 12")
LSCP	Misc: Landscape
MAIL	Mail boxes
MAJR	All: Major lines

Abbrev:	Description:
MARK	Channelization: directional arrow
MATC	Sheets: Match lines
MHOL	Utilities: Maintenance holes
MINR	All: Minor lines
MRKG	All: Markings
NOTE	Sheets: Notes
NPLT	Misc: Non-plotting graphic information
NRTH	Sheets: North arrows
NSBR	Walls: Noise Barriers
NATL	National Boundaries
OTLN	Buildings: Outline
OVHD	Buildings: Overhead (overhang)
PAVR	Pavement: pavers
PERM	All: Permanent
PHON	Utilities: Telephone lines
PIPE	Utilities: Pipes
PLSS	Public Land Survey System
POLE	Utilities: Boxes / poles
POST	Fencing: Posts
PRCH	Buildings: Porch (attached, roof overhead)
PROF	Profiles
PROJ	Grading: Projection lines
RAMP	Channelization: curbramp
RDME	Misc: Read-me layer (not plotted)
REDL	Misc: Redlines
REPL	Wetlands: Replacement
REVC	Misc: Revision clouds
REVS	Sheets: Revisions
ROAD	Pavement: Roadways
ROCK	Rockery/rocks
RTWL	Walls: Retaining walls
RWAY	Easements: Right-of-way (public access)
SAMP	Sections: Sample lines
SBCK	Property: Setback lines
SCHD	Sheets: Schedules
SECT	Sections
SEGM	Channelization: segment
SERV	Utilities: water services
SHEA	Walls: Structural bearing or shear walls
SIGL	Traffic Signals
SIGN	All: Signs
SILT	TESC: Silt fence
SLID	Channelization: solid

Abbrev:	Description:
SLNE	Channelization: stopline
SLOP	Grading: Slope patterns
SMAL	Utilities: Small piping (< 12")
SPOT	Topography: Spot elevations
SSLT	TESC: Super silt fence
STAN	Alignments: Stationing
STEL	Fencing: Steel
STRC	Utilities: Structures
STRP	Channelization: Striping
STEP	Stairs/steps
SUBA	Corridors: Sub-assemblies
SUBT	Annotation: Sub-titles
SURF	Surface
SWAY	Utilities: Spillway
SWMT	Utilities: Storm water management
SYMB	Sheets: Reference symbols
TABL	Sheets: Tables
TANK	Utilities: Storage tanks
TEMP	All: Temporary
TITL	Annotation: Titles
TOEB	Topography: Toe of bank
TOPB	Topography: Top of bank
TOPD	Ditches: Top of ditch
TPIT	Topography: Test pits
TRAK	Channelization: track
TRAL	Pavement: Trail or path (public access)
TTLB	Sheets: Border and title blocks
UNDR	Utilities: Underground
UPVD	Pavement: Unpaved surface
UTIL	Utilities
VIEW	View frames/boxes
WELL	Utilities: Wells
WHIT	Channelization: White paint lines
WOOD	Fencing: Wood
XWLK	Channelization: crosswalk
YELO	Channelization: Yellow paint lines

Layer Fields: Status



Character:	Description:
1	Phase/iteration 1
2	Phase/iteration 2
3	Phase/iteration 3
4	Phase/iteration 4
5	Objects only displayed at 1" = 5' scale
10	Objects only displayed at 1" = 10' scale
20	Objects only displayed at 1" = 20' scale
30	Objects only displayed at 1" = 30' scale
40	Objects only displayed at 1" = 40' scale
50	Objects only displayed at 1" = 50' scale
80	Objects only displayed at 1" = 80' scale
100	Objects only displayed at 1" = 100' scale
H	Horizontal
V	Vertical

Layer Color Guidelines

As a general rule, different object types are assigned to separate layers. Follow these guidelines when assigning colors to layers, unless otherwise noted in the list of Common Layer Names below:

Object Type	Existing Layer Color(s)	Proposed Layer Color(s)
Layer colors for Linework/Blocks	125	<i>(choose color from Section 8: Plotting/Printing, p. 64)</i>
Layer colors for Annotation	<i>(choose color from the Text Color and Size Chart, p. 59)</i>	
Layer colors for Hatch	125	22
Layer colors for Civil 3D Objects	125	7

Common Layer Names

The SPU/SDoT templates come pre-loaded with a few standard layers by default. Below is a list of some common layer names (not all layer names are represented here).

[] is to be replaced with one of the Discipline Designators shown on page 27.

Sheet Annotation

Annotation in Paper Space/Title Block Drawings

Layer Name	Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies to
[]-ANNO	Sheet Annotation (typically used on sheet/title block drawings)	125/7	Continuous	Annotation
[]-ANNO-BARS	Bar Scales	125/7	Continuous	Linework
[]-ANNO-BRNG	Bearings and distance labels (survey coordinates)	125/7	Continuous	Annotation
[]-ANNO-GRID	Profile Grid	1	DOT	Linework
[]-ANNO-GRID-MAJR	Profile Grid - Major	22	GRID2	Linework
[]-ANNO-GRID-MINR	Profile Grid - Minor	22	GRID1	Linework
[]-ANNO-IDEN	Identification tags	125/7	Continuous	Annotation
[]-ANNO-KEYN	Keynotes	125/7	Continuous	Annotation
[]-ANNO-LABL	Labels	125/7	Continuous	Annotation
[]-ANNO-LEGN	Legends, symbol keys	125/7	Continuous	Annotation
[]-ANNO-MARK	Markers, break marks	125/7	Continuous	Annotation
[]-ANNO-MATC	Match lines	2	Continuous	Annotation
[]-ANNO-NOTE	Notes	125/7	Continuous	Annotation
[]-ANNO-NPLT	Non-plotting graphic information	6	Continuous	Annotation
[]-ANNO-NRTH	North Arrows	125/7	Continuous	Linework
[]-ANNO-RDME	Read-me layer (not plotted)	1	Continuous	Annotation
[]-ANNO-REVC	Revision clouds	6	Continuous	Annotation

Layer Name	Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies to
[]-ANNO-REVS	Revisions	7	Continuous	Annotation
[]-ANNO-RWAY	Street Names (labels for maps)	205	Continuous	Annotation
[]-ANNO-RWAY-SUBT	Side Street Names (streets adjacent to street with proposed improvement)	145	Continuous	Annotation
[]-ANNO-RWAY-TITL	Main Street Name (street with proposed improvement)	205	Continuous	Annotation
[]-ANNO-SCHD	Schedules	125/7	Continuous	Annotation
[]-ANNO-SUBT	Sub-title	145/2	Continuous	Annotation
[]-ANNO-SYMB	Reference symbols	125/7	Continuous	Annotation
[]-ANNO-TABL	Data tables	125/7	Continuous	Annotation
[]-ANNO-TEXT	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-VIEW-FRME	view frame	120	Continuous	Linework

Legal

Property & Boundaries

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-BNDY	Political Boundaries	165	BORDER	Linework & Civil 3D Object
[]-BNDY-ANNO	text, dimensions, leaders, etc.	125/7	BORDER	Annotation
[]-BNDY-CITY	City boundaries	165	BORDER	Linework
[]-BNDY-CNTY	County boundaries	165	BORDER	Linework
[]-BNDY-NATL	National boundaries	165	BORDER	Linework
[]-BNDY-ZONE	Political zoning	165	BORDER	Linework
[]-PROP	Parcel lines	185	HIDDEN	Linework & Civil 3D Object
[]-PROP-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-PROP-DONA	Legal-donation land claim	125	HIDDEN	Linework
[]-PROP-LINE	interior lot lines, survey benchmarks, property corners	125	HIDDEN	Linework
[]-PROP-ORDI	Property boundary-legal ordinance	125	DASHED2	Linework
[]-PROP-QTRS	Property boundary-quarter section	125	BORDER2	Linework
[]-PROP-RSRV	Property boundary-reserve	125	HIDDEN	Linework
[]-PROP-SBCK	setback lines	125	HIDDEN	Linework
[]-PROP-SECT	Property boundary-section boundary	125	BORDER2	Linework
[]-PROP-SUBD	Property boundary- subdivision (interior) lines	125	BORDER2	Linework
[]-PROP-SXTS	Property boundary-sixteenth section	125	BORDER2	Linework
[]-PROP-TABL	tables	125/7	Continuous	Linework
[]-PROP-VACA	Property boundary-Legal vacation	185	PSS	Linework

Right-of-Way

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-RWAY	Right-of-way	185	Continuous	Linework
[]-RWAY-ANNO	Text, dimensions, leaders, etc.	205	Continuous	Annotation
[]-RWAY-CNTR	centerline	125/1	CENTER3	Linework
[]-RWAY-CTLA	controlled access	205/2	Continuous	Linework
[]-RWAY-LINE	lines	185	Continuous	Linework
[]-RWAY-LMTA	limited access	185	BUILDING	Linework
[]-RWAY-MRKR	marker	125/7	Continuous	Linework
[]-RWAY-STAN	stationing	125/7	Continuous	Annotation

Easements

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-ESMT	Easements	125/7	Continuous	Linework & Civil 3D Object
[]-ESMT-ACCS	access (pedestrian only; private access)	205/2	EASEMENT	Linework
[]-ESMT-ANNO	Text, dimensions, leaders, etc.	205/2	EASEMENT	Annotation
[]-ESMT-CATV	utility - cable television	205/2	EASEMENT	Linework
[]-ESMT-CONS	conservation	205/2	EASEMENT	Linework
[]-ESMT-CSTG	construction / grading	205/2	EASEMENT	Linework
[]-ESMT-ELEC	utility - electrical	205/2	EASEMENT	Linework
[]-ESMT-FDPL	flood plain	205/2	EASEMENT	Linework
[]-ESMT-INEG	ingress / egress (vehicles; private access)	205/2	EASEMENT	Linework
[]-ESMT-LSCP	landscape	205/2	EASEMENT	Linework
[]-ESMT-NGAS	natural gas line	205/2	EASEMENT	Linework
[]-ESMT-PHON	telephone line	205/2	EASEMENT	Linework
[]-ESMT-ROAD	roadway	205/2	EASEMENT	Linework
[]-ESMT-ROAD-PERM	roadway: permanent	205/2	EASEMENT	Linework
[]-ESMT-ROAD-TEMP	roadway: temporary	53	DOT2	Linework
[]-ESMT-RWAY	right-of-way (public access)	185	Continuous	Linework
[]-ESMT-SGHT	sight distance	205/2	EASEMENT	Linework
[]-ESMT-SSWR	sanitary sewer	205/2	EASEMENT	Linework
[]-ESMT-STRM	storm sewer	205/2	EASEMENT	Linework
[]-ESMT-SWMT	storm water management	205/2	EASEMENT	Linework

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-ESMT-TRAL	trail or path (public access)	205/2	EASEMENT	Linework
[]-ESMT-UTIL	utilities	205/2	EASEMENT	Linework
[]-ESMT-WATR	water supply	205/2	EASEMENT	Linework
[]-ESMT-ACCS	access (pedestrian only; private access)	205/2	EASEMENT	Linework
[]-ESMT-ANNO	Text, dimensions, leaders, etc.	205/2	EASEMENT	Annotation
[]-ESMT-CATV	utility - cable television	205/2	EASEMENT	Linework
[]-ESMT-CONS	conservation	205/2	EASEMENT	Linework
[]-ESMT-CSTG	construction / grading	205/2	EASEMENT	Linework
[]-ESMT-ELEC	utility - electrical	205/2	EASEMENT	Linework
[]-ESMT-FDPL	flood plain	205/2	EASEMENT	Linework
[]-ESMT-INEG	ingress / egress (vehicles; private access)	205/2	EASEMENT	Linework

Site/Topo Features

Buildings

Layer Name	Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies to
[-BLDG	Buildings and primary structures	125/7	BUILDING	Linework & Civil 3D Object
[-BLDG-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[-BLDG-DECK	Outdoor decks (no roof)	125/7	BUILDING	Linework
[-BLDG-OTLN	Outline	125/7	BUILDING	Linework
[-BLDG-OVHD	Overhead (overhang)	125/7	BUILDING	Linework
[-BLDG-PRCH	Porch (attached, roof overhead)	125/7	BUILDING	Linework

Borings

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[-BORE	Test borings	125/7	Continuous	Linework & Civil 3D Object
[-BORE-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation

Erosion Control

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[-EROS	Erosion and sediment control	125/7	Continuous	Linework & Civil 3D Object
[-EROS-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[-EROS-CIPR	culvert inlet protection	145	Continuous	Hatch
[-EROS-CNTE	construction entrance	125/3	PHANTOM2	Linework
[-EROS-DDIV	drainage divides	125/3	Continuous	Linework
[-EROS-DVDK	diversion dike	125/3	Continuous	Linework
[-EROS-INPR	inlet protection	145	Continuous	Hatch
[-EROS-SILT	silt fence	125/7	CHAIN_LINK_FENCE	Linework
[-EROS-SSLT	super silt fence	125/7	CHAIN_LINK_FENCE	Linework

Fencing

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[-FENC	Fences	125/7	Continuous	Linework & Civil 3D Object
[-FENC-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[-FENC-GRAL	guard rail	125/7	GUARD_RAIL	Linework
[-FENC-HRAL	hand rail	125/7	HAND_RAIL	Linework
[-FENC-POST	posts	125/7	Continuous	Linework
[-FENC-STEL	steel (barbed wire and/or chain link)	125/7	CHAIN_LINK_FENCE	Linework
[-FENC-WOOD	wood	125/7	WOOD_FENCE	Linework

Landscaping

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[-PLNT	Plant and landscape material	125/7	Continuous	Linework & Civil 3D Object
[-PLNT-ANNO	text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[-PLNT-BEDS	perennial and annual beds	125/2	Continuous	Linework
[-PLNT-BUSH	bushes and shrubs	125/2	Continuous	Linework
[-PLNT-CONI	coniferous trees	125/2	Continuous	Linework
[-PLNT-CTNR	container or planter	125/6	Continuous	Linework
[-PLNT-DECI	deciduous trees	125/2	Continuous	Linework
[-PLNT-EDGR	planting bed edger	125/6	Continuous	Linework
[-PLNT-GRND	ground covers	125/2	Continuous	Linework
[-PLNT-PALM	palm trees	125/2	Continuous	Linework
[-PLNT-PLTS	planting plants	125/2	Continuous	Linework
[-PLNT-REM	material to remain	125/2	Continuous	Linework
[-PLNT-REMOV	material to be removed	125/7	Continuous	Linework
[-PLNT-SEED	seeding areas	125/22	Continuous	Hatch
[-PLNT-SHAD	shadow area	125/22	Continuous	Hatch
[-PLNT-SHRB	shrub symbols	125/2	Continuous	Linework
[-PLNT-TREE	trees	125/2	Continuous	Linework
[-PLNT-TURF	lawn areas	125/22	Continuous	Hatch
[-PLNT-VINE	vines	125/2	Continuous	Linework

Major Water Bodies (navigable channels such as major rivers, lakes and the Puget Sound)

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-CHAN	Major water bodies (navigable channels)	125/7	Continuous	Linework & Civil 3D Object
[]-CHAN-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-CHAN-EDGE	edge	125/2	Continuous	Linework
[]-CHAN-CNTR	center of channel	125/1	CENTER3	Linework
[]-CHAN-TOEB	toe of bank	125/2	PHANTOM2	Linework
[]-CHAN-TOPB	top of bank	125/2	PHANTOM2	Linework

Ponds

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-POND	Ponds	125/7	Continuous	Linework & Civil 3D Object
[]-POND-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-POND-EDGE	edge	125/2	Continuous	Linework
[]-POND-SWAY	spillway	125/2	Continuous	Linework
[]-POND-TOEB	toe of bank	125/2	PHANTOM2	Linework
[]-POND-TOPB	top of bank	125/2	PHANTOM2	Linework

Rivers and Creeks

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-RIVR	Rivers and creeks	125/7	Continuous	Linework & Civil 3D Object
[]-RIVR-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-RIVR -EDGE	edge	125/2	Continuous	Linework
[]-RIVR -CNTR	center of channel	125/1	CENTER3	Linework
[]-RIVR -TOEB	toe of bank	125/2	PHANTOM2	Linework
[]-RIVR -TOPB	top of bank	125/2	PHANTOM2	Linework
[]-RIVR-LOGS	logs	125/2	Continuous	Linework
[]-RIVR-ROCK	rocks	125/2	Continuous	Linework

Surface Materials (non roadway)

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-PVMT	Pavement (non-roadway paving, i.e. conc pads)	125/2	Continuous	Linework & Civil 3D Object
[]-PVMT-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-PVMT-ASPH	asphalt surface	125/22	Continuous	Linework & Hatch
[]-PVMT-CONC	concrete surface	125/22	Continuous	Linework & Hatch
[]-PVMT-GRVL	gravel surface	125/22	Continuous	Linework & Hatch
[]-PVMT-PAVR	unit paver surface	125/22	Continuous	Linework & Hatch
[]-RRAP	Riprap	125/7	Continuous	Linework & Civil 3D Object

Surface/Topology

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-TOPO	Surfaces	125/7	Continuous	Civil 3D Object
[]-TOPO-ANNO	Surface annotation	125/7	Continuous	Annotation
[]-TOPO-MAJR	Major contour lines	125/2	Continuous	Linework
[]-TOPO-MINR	Minor contour lines	125/7	Continuous	Linework
[]-TOPO-TOPB	Top of bank	125/2	PHANTOM2	Linework
[]-TOPO-TOEB	Toe of bank	125/2	PHANTOM2	Linework
[]-TINN-BNDY	Terrain Irregular Network surface boundary	125/2	PHANTOM2	Linework
[]-TINN-VIEW	Terrain Irregular Network surface triangles	250	Continuous	Linework

Site

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-LOCN	Limits of construction	3	PHANTOM2	Linework
[]-LOCN-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-SITE	Site features	125/7	Continuous	Linework & Civil 3D Object

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-SITE-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-SITE-BARR	barriers	125/7	Continuous	Linework
[]-SITE-BIKE	bike racks	125/7	Continuous	Linework
[]-SITE-BNCH	benches	125/7	Continuous	Linework
[]-SITE-COLS	columns	125/2	Continuous	Linework
[]-SITE-EWAT	edge of water	125/2	Continuous	Linework
[]-SITE-MAIL	mail boxes	125/7	Continuous	Linework
[]-SITE-POST	posts	125/7	Continuous	Linework
[]-SITE-POLE	light poles	125/2	Continuous	Linework
[]-SITE-WEIR	weirs	125/2	Continuous	Linework

Walls

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-WALL	Walls	125/7	Continuous	Linework & Civil 3D Object
[]-WALL-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-WALL-CTLJ	control joints	125/3	Continuous	Linework
[]-WALL-NSBR	noise barrier	125/3	Continuous	Linework
[]-WALL-RTWL	retaining	125/3	Continuous	Linework
[]-WALL-SHEA	structural bearing or shear walls	125/3	Continuous	Linework

Wetlands

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-WETL	Wetlands	125/1	Continuous	Linework
[]-WETL-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-WETL-BUFF	buffer	22	Continuous	Hatch
[]-WETL-REPL	replacement	22	Continuous	Hatch

Utilities

Sewer/Drainage

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-DTCH	Ditches or washes	125/2	Continuous	Linework & Civil 3D Object
[]-DTCH-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-DTCH-BOTD	bottom	125/2	ENDITCH/ PNDITCH	Linework
[]-DTCH-EWAT	edge of water	125/7	Continuous	Linework
[]-DTCH-TOPD	top	125/2	WDITCH	Linework
[]-STRM	Storm sewer	125/7	Continuous	Linework & Civil 3D Object
[]-STRM-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-STRM-CNTR	centerline	125/1	CENTER3	Linework
[]-STRM-HTCH	Hatching	22	Continuous	Hatch
[]-STRM-LATL	storm drain connection	125/4	SD/ Continuous	Linework
[]-STRM-MHOL	maintenance hole casting	125/6	MH/ Continuous	Linework
[]-STRM-PIPE- LRGE	piping: >= 12"	125/3	PSS/ Continuous	Linework
[]-STRM-PIPE- SMAL	piping: < 12"	125/6	PSS/ Continuous	Linework
[]-STRM-STRC	structures	125/3	MH/ Continuous	Linework
[]-SSWR	Sanitary sewer	125/7	Continuous	Linework & Civil 3D Object
[]-SSWR-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-SSWR-CNTR	centerline	125/1	CENTER3	Linework
[]-SSWR-HTCH	hatching	22	Continuous	Hatch
[]-SSWR-LATL	lateral line	125/4	SD/ Continuous	Linework
[]-SSWR-MHOL	maintenance hole casting	125/6	MH/ Continuous	Linework
[]-SSWR-PIPE- LRGE	piping: >= 12"	125/3	PSS/ Continuous	Linework
[]-SSWR-PIPE- SMAL	piping: < 12"	125/6	PSS/ Continuous	Linework
[]-SSWR-STRC	structures	125/3	MH/ Continuous	Linework

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-CSWR	Combined sewer	125/7	Continuous	Linework & Civil 3D Object
[]-CSWR-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-CSWR-CNTR	centerline	125/1	CENTER3	Linework
[]-CSWR-HTCH	hatching	22	Continuous	Hatch
[]-CSWR-LATL	storm drain connection	125/4	SD/ Continuous	Linework
[]-CSWR-MHOL	maintenance hole casting	125/6	MH/ Continuous	Linework
[]-CSWR-PIPE- LRGE	piping: >= 12"	125/3	PSS/ Continuous	Linework
[]-CSWR-PIPE- SMAL	piping: < 12"	125/6	PSS/ Continuous	Linework
[]-CSWR-STRC	structures	125/3	MH/ Continuous	Linework

Water/Fire/Irrigation

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-WATR	Water supply systems	125/7	Continuous	Linework & Civil 3D Object
[]-WATR-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-WATR-CNTR	centerline	125/1	CENTER3	Linework
[]-WATR-HTCH	hatching	22	Continuous	Hatch
[]-WATR-INST	instrumentation (meters, valves, etc.)	125/6	Continuous	Linework
[]-WATR-PIPE	pipes and fittings	125/6	WATER/ Continuous	Linework
[]-WATR-SERV	water services	125/6	WATER/ Continuous	Linework
[]-WATR-STRC	water structures (casings, tie- backs, vaults, etc.)	125/2	Continuous	Linework
[]-WATR-WELL	well	125/6	Continuous	Linework
[]-FIRE-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-FIRE-HYDR	hydrants and connections	125/7	Continuous	Linework
[]-FIRE-PIPE	piping	125/6	WATER/ Continuous	Linework

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-IRRG	Irrigation	125/7	Continuous	Linework & Civil 3D Object
[]-IRRG-ANNO	text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-IRRG-COVR	coverage	125/22	Continuous	Hatch
[]-IRRG-DRIP	drip irrigation tubing	125/7	Continuous	Linework
[]-IRRG-EQPM	equipment (pumps, valves, and controllers)	125/6	Continuous	Linework
[]-IRRG-LTRL	lateral pipe	125/6	WATER/ Continuous	Linework
[]-IRRG-MAIN	mainline	125/6	WATER/ Continuous	Linework
[]-IRRG-PIPE	piping	125/6	WATER/ Continuous	Linework
[]-IRRG-SLVE	pipe sleeve	125/6	Continuous	Linework
[]-IRRG-SPKL	sprinklers (rotors, heads)	125/6	Continuous	Linework
[]-IRRG-VALV	valves	125/6	Continuous	Linework

Power

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-POWR	Power	125/7	Continuous	Linework & Civil 3D Object
[]-POWR-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-POWR-FENC	enclosure fence	125/7	CHAIN_LINK_FENCE	Linework
[]-POWR-INST	instrumentation (meters, hand holes, transformers, etc.)	125/2	Continuous	Linework
[]-POWR-MHOL	maintenance hole	125/3	Continuous	Linework
[]-POWR-OVHD	overhead lines	125/3	Continuous	Linework
[]-POWR-POLE	box / pole	125/3	Continuous	Linework
[]-POWR-STRC	structures	125/3	Continuous	Linework
[]-POWR-UNDR	underground lines	125/3	ECD	Linework

Fuel/Gas

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-FUEL	Fuel gas	125/7	Continuous	Linework & Civil 3D Object
[]-FUEL-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-FUEL-EQPM	equipment (pumps, motors)	125/7	Continuous	Linework
[]-FUEL-INST	instrumentation (meters, valves, etc.)	125/7	Continuous	Linework
[]-FUEL-MHOL	maintenance hole	125/7	Continuous	Linework
[]-FUEL-PIPE	piping	125/6	Continuous	Linework
[]-FUEL-TANK	storage tanks	125/2	Continuous	Linework
[]-FUEL-UNDR	underground piping	125/6	Continuous	Linework
[]-NGAS	Natural Gas	125/2	Continuous	Linework & Civil 3D Object
[]-NGAS-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-NGAS-INST	natural gas: meters, valves, etc.	125/2	Continuous	Linework
[]-NGAS-PIPE	natural gas: pipes	125/2	GAS	Linework
[]-NGAS-TANK	natural gas: tanks	125/2	Continuous	Linework

Communications

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-COMM	Communications	125	Continuous	Linework & Civil 3D Object
[]-COMM-ANNO	Text, dimensions, leaders, etc.	125	Continuous	Annotation
[]-COMM-OVHD	Overhead lines	125	oh_comm	Linework
[]-COMM-POLE	Box / pole	125	Continuous	Linework
[]-COMM-UNDR	Underground lines	125	Tel	Linework
[]-COMM-INST	Instrumentation (hand holes, etc.)	125	Continuous	Linework
[]-COMM-FIBR	Fiber optic lines	125	Tel	Linework

Roadways

Roadway Paving/Channelization/Signals

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-ROAD	Roadways	125/2	Continuous	Linework & Civil 3D Object
[]-ROAD-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-ROAD-ASPH-OUTL	asphalt hatch outline	125/2	Continuous	Linework
[]-ROAD-ASPH	asphalt surface	125/22	Continuous	Linework & Hatch
[]-ROAD-CNTR	centerline	125/1	CENTER3	Linework
[]-ROAD-CONC-OUTL	concrete hatch outline	125/2	Continuous	Linework
[]-ROAD-CONC	concrete surface	125/7	Continuous	Linework & Hatch
[]-ROAD-CURB	curb	125/4	Continuous	Linework
[]-ROAD-CURB-BACK	curb: back	125/4	Continuous	Linework
[]-ROAD-CURB-FACE	curb: face	125/4	Continuous	Linework
[]-ROAD-FLNE	fire lane	125/1	Continuous	Linework
[]-ROAD-FLNE-MRKG	fire lane: pavement markings	125/7	Continuous	Linework
[]-ROAD-FLNE-SIGN	fire lane: signs	125/7	Continuous	Linework
[]-ROAD-GRVL-OUTL	gravel hatch outline	125/2	Continuous	Linework
[]-ROAD-GRVL	gravel surface	125/22	Continuous	Linework & Hatch
[]-ROAD-MRKG	channelization: pavement markings	125/7	Continuous	Linework
[]-ROAD-MRKG-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Linework
[]-ROAD-MRKG-CNTR	channelization: center	127/2	CHANDASH10-20	Linework
[]-ROAD-MRKG-GZON	channelization: green bike zones	125/3	Continuous	Linework
[]-ROAD-MRKG-LEGN	channelization: legend	125/1	Continuous	Linework
[]-ROAD-MRKG-SLNE	channelization: stopline	125/3	Continuous	Linework
[]-ROAD-MRKG-WHIT-EDGE	channelization: white paint: edge	125/7	CHANSEG2-4	Linework
[]-ROAD-MRKG-WHIT-LANE	channelization: white paint: lane	125/7	CHANDASH10-20	Linework
[]-ROAD-MRKG-WHIT-SEGM	channelization: white paint: segment	125/7	Continuous	Linework
[]-ROAD-MRKG-WHIT-SLID	channelization: white paint: solid	125/7	Continuous	Linework

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-ROAD-MRKG-XWLK	channelization: crosswalk	125/3	Continuous	Linework
[]-ROAD-MRKG-YELO-SEGM	channelization: yellow paint: segment	125/2	Continuous	Linework
[]-ROAD-MRKG-YELO-SLID	channelization: yellow paint: solid	125/2	Continuous	Linework
[]-ROAD-PAVR	unit paver surface	125/22	Continuous	Linework & Hatch
[]-ROAD-PLNT-OUTL	median/planting strip hatch outline	125/2	Continuous	Linework
[]-ROAD-PLNT	median/planting strip	125/22	Continuous	Hatch
[]-ROAD-PROF	profile	125/2	DASHED2/ Continuous	Linework
[]-ROAD-SIGL	traffic signals	125/7	Continuous	Linework
[]-ROAD-SIGL-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Linework
[]-ROAD-SIGL-FIXT	traffic signals: pedestrian push buttons, etc.	125/1	Continuous	Linework
[]-ROAD-SIGL-INST	traffic signals: hand holes, cabinets, etc.	125/1	Continuous	Linework
[]-ROAD-SIGL-LOOP	traffic signals: loops	125/1	Continuous	Linework
[]-ROAD-SIGN	signs	125/1	Continuous	Linework
[]-ROAD-STAN	stationing	125/7	Continuous	Linework
[]-ROAD-UPVD	unpaved surface	125/22	Continuous	Linework & Hatch

Driveways

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-DRIV	Driveways	125/7	Continuous	Linework & Civil 3D Object
[]-DRIV-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-DRIV-ASPH-OUTL	asphalt hatch outline	125/2	Continuous	Linework
[]-DRIV-ASPH	asphalt surface	125/22	Continuous	Linework & Hatch
[]-DRIV-CNTR	centerline	125/1	CENTER3	Linework
[]-ROAD-CONC-OUTL	concrete hatch outline	125/2	Continuous	Linework
[]-DRIV-CONC	concrete surface	125/7	Continuous	Linework & Hatch

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-DRIV-CURB	curb	125/4	Continuous	Linework
[]-DRIV-CURB-BACK	curb: back	125/4	Continuous	Linework
[]-DRIV-CURB-FACE	curb: face	125/4	Continuous	Linework
[]-DRIV-FLNE	fire lane	125/1	Continuous	Linework
[]-DRIV-FLNE-MRKG	fire lane: pavement markings	125/7	Continuous	Linework
[]-DRIV-FLNE-SIGN	fire lane: signs	125/7	Continuous	Linework
[]-DRIV-GRVL	gravel surface	125/22	Continuous	Linework & Hatch
[]-DRIV-MRKG	pavement markings	125/7	Continuous	Linework
[]-DRIV-MRKG-WHIT	white paint	125/7	Continuous	Linework
[]-DRIV-MRKG-YELO	yellow paint	125/2	Continuous	Linework
[]-DRIV-SIGN	signs	125/7	Continuous	Linework
[]-DRIV-UPVD	unpaved surface	125/22	Continuous	Hatch

Sidewalks

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-SWLK	Sidewalks	125/2	Continuous	Linework & Civil 3D Object
[]-SWLK-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-SWLK-ASPH-OUTL	asphalt hatch outline	125/2	Continuous	Linework
[]-SWLK-ASPH	asphalt	125/22	Continuous	Hatch
[]-SWLK-CONC-OUTL	concrete hatch outline	125/2	Continuous	Linework
[]-SWLK-CONC	concrete	125/22	Continuous	Hatch
[]-SWLK-RAMP	curb ramps	125/2	Continuous	Linework
[]-SWLK-STEP	stairs/steps	125/2	Continuous	Linework

Trails/Paths

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-TRAL	Trails or paths	125/2	Continuous	Linework & Civil 3D Object
[]-TRAL-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-TRAL-ASPH	asphalt surface	125/22	Continuous	Hatch
[]-TRAL-CONC	concrete surface	125/22	Continuous	Hatch
[]-TRAL-GRVL	gravel surface	125/22	Continuous	Hatch
[]-TRAL-MRKG	pavement markings	125/7	Continuous	Linework
[]-TRAL-SIGN	signs	125/7	Continuous	Linework
[]-TRAL-UPVD	unpaved surface	125/22	Continuous	Hatch

Parking Lots

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-PRKG	Parking	125/2	Continuous	Linework & Civil 3D Object
[]-PRKG-ANNO	Text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-PRKG-ASPH-OUTL	asphalt hatch outline	125/2	Continuous	Linework
[]-PRKG-ASPH	asphalt surface	125/22	Continuous	Hatch
[]-PRKG-CONC-OUTL	concrete hatch outline	125/2	Continuous	Linework
[]-PRKG-CONC	concrete surface	125/7	Continuous	Hatch
[]-PRKG-CURB	curb	125/4	Continuous	Linework
[]-PRKG-CURB-BACK	curb: back	125/4	Continuous	Linework
[]-PRKG-CURB-FACE	curb: face	125/4	Continuous	Linework
[]-PRKG-FIXT	fixtures (wheel stops, parking meters, etc.)	125/1	Continuous	Linework
[]-PRKG-FLNE	fire lane	125/7	Continuous	Linework
[]-PRKG-FLNE-MRKG	fire lane: pavement markings	125/7	Continuous	Linework
[]-PRKG-FLNE-SIGN	fire lane: signage	125/1	Continuous	Linework
[]-PRKG-GRVL	gravel surface	125/22	Continuous	Hatch
[]-PRKG-MRKG	pavement markings	125/7	Continuous	Linework
[]-PRKG-MRKG-WHIT	white paint	125/7	Continuous	Linework
[]-PRKG-MRKG-YELO	yellow paint	125/2	Continuous	Linework
[]-PRKG-SIGN	signs	125/1	Continuous	Linework
[]-PRKG-STRP	striping	125/7	Continuous	Linework

Details

Detail Drawings

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
[]-DETL	Details	125/7	Continuous	Linework & Civil 3D Object
[]-DETL-ANNO	text, dimensions, leaders, etc.	125/7	Continuous	Annotation
[]-DETL-ANNO-SUBT	sub-title	145/2	Continuous	Annotation
[]-DETL-ANNO-TITL	title	205/3	Continuous	Annotation
[]-DETL-CNTR	center lines	125/1	CENTER2	Linework
[]-DETL-CON1	continuous lines - thick	145/2	Continuous	Linework
[]-DETL-CON2	continuous lines - thin	125/7	Continuous	Linework
[]-DETL-HID1	hidden lines - thick	145/2	HIDDEN	Linework
[]-DETL-HID2	hidden lines - thin	125/7	HIDDEN	Linework
[]-DETL-HTCH	hatching	125/22	Continuous	Hatch

External References

XREF Layers

Layer Name	Layer Description	Existing/ Proposed Colors	Existing/ Proposed Linetypes	Applies To
X-BASE	XREF: base map	7	Continuous	XREF
X-CHAN	XREF: major water bodies (channels, lakes & Puget Sound)	7	Continuous	XREF
X-CLIP	XREF: clipping boundary	7	Continuous	Linework
X-DEMO	XREF: demolition/clearing/removal	7	Continuous	XREF
X-DETL	XREF: details	7	Continuous	XREF
X-EROS	XREF: temporary erosion & sediment control	7	Continuous	XREF
X-GRAD	XREF: grading	7	Continuous	XREF
X-IMGS	XREF: images/photos	7	Continuous	Images
X-INST	XREF: electrical instrumentation	7	Continuous	XREF
X-IRRG	XREF: irrigation	7	Continuous	XREF
X-MISC	XREF: misc.	7	Continuous	XREF
X-MRKG	XREF: channelization		Continuous	XREF
X-PERC	XREF: Prelim. Engineering Resource Composite	7	Continuous	XREF
X-POND	XREF: ponds	7	Continuous	XREF
X-POWR	XREF: SCL power design	7	Continuous	XREF
X-PROT	XREF: protection	7	Continuous	XREF
X-RDWG	XREF: record drawing	7	Continuous	XREF
X-RIVR	XREF: rivers and creeks	7	Continuous	XREF
X-ROAD	XREF: paving	7	Continuous	XREF
X-RWAY	XREF: right-of-way	7	Continuous	XREF
X-CSWR	XREF: combined sewer	7	Continuous	XREF
X-SIGL	XREF: signals	7	Continuous	XREF
X-SITE	XREF: site	7	Continuous	XREF
X-SSWR	XREF: sewer	7	Continuous	XREF
X-STRM	XREF: drainage	7	Continuous	XREF
X-STRU	XREF: structural	7	Continuous	XREF
X-TOPO	XREF: survey	7	Continuous	XREF
X-VEGE	XREF: landscaping	7	Continuous	XREF
X-VIEW	XREF: view frames	7	Continuous	XREF
X-WATR	XREF: water	7	Continuous	XREF

Section 6: Linework

Linework should be drawn in accordance with STANDARD PLAN NO 003. As a general rule features should be drawn in model space, located per an established survey control line, overlaid into a sheet drawing along with the survey/base map and visible through a viewport in paper space. Details should also be drawn in model space, overlaid into a sheet drawing, and visible through a viewport in paper space. Schedules, notes, legends, tables, schematics and diagrams may be placed directly in paper space if so desired.

Drafting Utilities

All geo-referenced pipes and structures must be drawn in a specific way in order to be exported into SPU's GIS system. The standard is to either draw utilities in 2D using "Polylines", "Multilines" and blocks or to depict gravity storm, sanitary sewer and combined sewer pipes with AutoCAD Civil 3D Pipe Networks. If drafting existing utilities in 2D, "Polylines" must be used to depict pipes less than 12" in diameter and "Multilines" must be used to depict pipes greater-than or equal to 12" in diameter.

Best Practices for 2D Utility Drafting

- **Line Endpoints:** Do not trim linework within blocks; "Polylines" and "Multilines" must be connected end-to-end. Our standard proposed blocks have a wipeout object inside to make the linework passing through look as though it was trimmed to the outside of the blocks (make sure the draw order is correct so the block is on top of the pipe linework). These new blocks are located on the web (see Section 2: Support Files) and on the internal SPU network (P:\CaddSupport\Blocks-2012).
- **Small Pipes:** For pipes that are less than 12" in diameter use the PLINE command to draw a "Polyline". A run of pipe with the same diameter can be drawn with one continuous "Polyline". If the pipe diameter changes at any point, end the PLINE command and start it again and continue drawing the pipe run. This ensures that pipes of different diameters are separate objects.
- **Large Pipes:** For pipes that are equal-to, or greater-than 12" in diameter a "Multiline" will be used with an associated hatch pattern filling the pipe. Type the MLSTYLE command to manage pipe sizes and set the proper pipe size current. There are a few pre-defined "Multiline Styles" in the design template. Click OK to close the "Multiline Style" dialog box, then type the MLINE command to draw a "Multiline". Once the MLINE command has been started type J, hit enter, type Z and hit enter again to set the justification to "Zero" (center of the pipe). Draw "Multilines" in the same way you draw "Polylines".
- **Elevations:** For consistency, draw all 2D linework at elevation 0. To make sure this happens, set the ONAPZ system variable to 1 to avoid snapping to another object's elevation.

Drafting Utilities with AutoCAD Civil 3D Pipe Networks

AutoCAD Civil 3D Pipe Networks may be used to depict existing and proposed gravity storm, sanitary sewer and combined sewer pipes. For your convenience, some basic styles have been defined in the templates. Standard out-of-the-box parts have been deployed in-house and are available on the web, but standard City of Seattle structures have not been provided. You may create structures in Civil 3D

Part Builder if so desired; otherwise it is expected that 3D models of structures are not accurately portrayed and should be depicted in plan and profile views as blocks. See Appendix 5 for more information on working with Civil 3D Pipe Networks.

Object Classification for Proposed Utilities

In order for 2D utility linework to be exported into our GIS system, “Object Data Tables” need to be added to each 2D utility pipe (“Polylines” and “Multilines”) and structure (block). This process is called “Object Classification”. At the end of a project, City staff export the geo-referenced utility data into the GIS system. Object classification is done in three steps within Civil 3D:

1. Use the ATTACHDEF command to attach the object classification XML file (see Section 2: Support Files).
2. Use the CLASSIFY command to classify water, sewer, drainage and combined sewer “Polylines”, “Multilines” and blocks. Care must be taken to ensure each object has the correct classification.
3. Select classified objects and use the PROPERTIES command to fill in the correct data. All objects contain the VPI (Vault Plan Index #) field which enables the GIS system to refer to the plan from which the object came.

Object Classification Checklist for Proposed Utilities

NOTE: Civil 3D objects do not need to be classified.

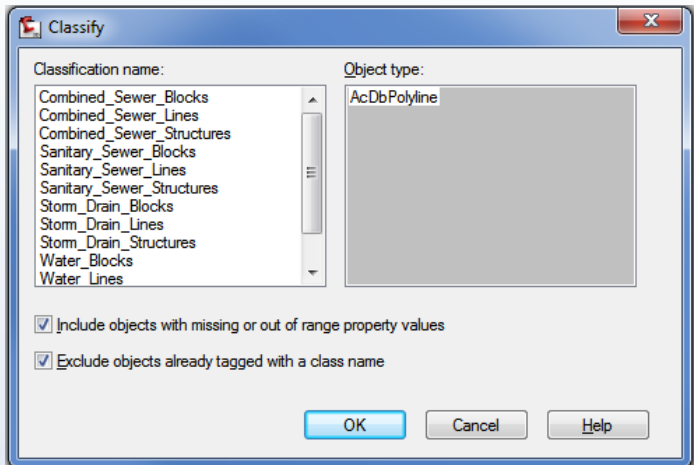
- ☐ Water, sewer, drainage and combined sewer pipes (including laterals, side sewers, services and fire protection pipes) must have the following object data attached and filled out:
 - InsideDiameter
 - Material
 - VPI
- ☐ Water, sewer, drainage and combined sewer custom structures (closed “Polylines”, not blocks, depicting outlines of encasements, tie-backs, tanks, custom structures, etc.) must have the following object data attached and filled out:
 - Description
 - VPI
- ☐ Water, sewer, drainage and combined sewer blocks must have the following object data attached and filled out:
 - VPI

Tip: How to Classify Proposed Utilities

Attach the Object Class Definition File to your drawing by using the **ATTACHDEF** command.

The **TR_Object_Classes_for_DD-RD.xml** definition file is available online or on the City’s internal network at: **P:\CaddSupport\Custom\Object_Classes**

To classify objects start the **CLASSIFY** command in Civil 3D.



Select the type of objects you are classifying (for example if you want to classify all the water lines, select the “Water_Lines” classification name) and click OK. Then select all the water lines in your drawing.

Once “Object Data Tables” have been added to the utility linework, fill in the tables with real data. To add data to an object, simply select one or more objects and start the **PROPERTIES** command. At the bottom of the “Properties” palette, you will see the object data fields:

OD:Water_Lines	
InsideDiameter	8
Material	DIP
VPI	777-123

Simply type the data into the fields and hit ESC to deselect the linework. Repeat this until all the linework have object data filled in.

Remember, you can select multiple objects at the same time. For example you could select several or even all pipes that are the same size and material. Then you only have to enter the object data for those pipes once, rather than individually for each object.

To see what objects have not yet been classified run the **MAPSELECTUNCLASSIFIED** command.

Hatch Patterns for Proposed Utilities, Paving & Vegetation

Hatch colors are controlled by layer. Here are common hatch patterns* used to depict proposed improvements on 1" = 20' scale plan view drawings (if plan view scale is different than 1" = 20', hatch scales shown below must change relative to 1" = 20'):

Description	Pattern	Angle	Scale (at 1" = 20')
Combined sewer mainlines (double line pipe fill)	DOTS	0	10
Sanitary sewer mainlines (double line pipe fill)	ANSI31	90	20
Storm drain mainlines (double line pipe fill)	ANSI31	0	10
Water mainlines (double line pipe fill)	DOTS	0	20
Asphalt paving for all surfaces	DOTS	45	10
Concrete paving for roadways & driveways	DOTS	45	20
Concrete paving for sidewalks & bike ways (non-roadway)	AR-CONC	45	1
Gravel roadways	GRAVEL	0	5
Unpaved roadways	DASH	0	10
Lawn areas	GRASS	0	2

*Additional hatch patterns (or variations thereof) may be used as long as a legend is included to describe it.

Section 7: Annotation

Most of the time annotation goes in model space (XREF drawing files) with the linework it is associated with; however there are cases in which annotation may appear in paper space. All annotation must be UPPERCASE.

Text Styles

For existing and proposed drawings the standard text style (command: STYLE) name is "COS" with the font set to RomanS.

For Record Drawings the standard text style name is set to "COS-Record" with the font set to RomanS and an obliquing angle of 20 degrees.

Text Color and Size Chart

Use the chart below as a guide to help you determine text colors and heights in drawings with typical engineering and architectural scales. Colors should be controlled by layers (see Section 5: Layers).

Drawing Scale Factor:		1*	5	10	20	50	100
Layout (viewport) Zoom Scale:		1 XP	1/5 XP	1/10 XP	1/20 XP	1/50 XP	1/100 XP
Scale Name:		1"=1'	1"=5'	1"=10'	1"=20'	1"=50'	1"=100'
COLOR & SIZE	RED/125 (station & offset/existing features)	0.08	0.4	0.8	1.6	4	8
	WHITE/105 (proposed features/house #s)	0.125	0.625	1.25	2.5	6.25	12.5
	YELLOW/145 (sub-titles/side streets)	0.1875	0.9375	1.875	3.75	9.375	18.75
	GREEN (titles)	0.25	1.25	2.5	5	12.5	25
	MAGENTA/205 (non-plotting notes/main streets)	0.3125	1.5625	3.125	6.25	15.625	31.25

Drawing Scale Factor:		16	24	32	48	64	96
Layout (viewport) Zoom Scale:		1/16 XP	1/24 XP	1/32 XP	1/48 XP	1/64 XP	1/96 XP
Scale Name:		3/4"=1'	1/2"=1'	3/8"=1'	1/4"=1'	3/16"=1'	1/8"=1'
COLOR & SIZE	RED/125 (station & offset/existing features)	1.28	1.92	2.56	3.84	5.12	7.68
	WHITE/105 (proposed features/house #s)	2	3	4	6	8	12
	YELLOW/145 (sub-titles/side streets)	3	4.5	6	9	12	18
	GREEN (titles)	4	6	8	12	16	24
	MAGENTA/205 (non-plotting notes/main streets)	5	7.5	10	15	20	30

*plotted text height

Dimension Styles

Here are a few important dimension style (command: DIMSTYLE) settings:

Dimensions for Proposed Features

- Arrowheads: Closed filled
- Arrow size: 0.14
- Text style: COS
- Text height: 0.125
- Scale for dimension features: Annotative

Dimensions for Existing Features

- Arrowheads: Closed filled
- Arrow size: 0.1
- Text style: COS
- Text height: 0.08
- Scale for dimension features: Annotative

Multileader Styles

Here are a few important multileader style (command: MLEADERSTYLE) settings:

Multileaders for Proposed Features

- Arrowhead size: 0.14
- Arrowhead symbol: Closed filled
- Leader type: Straight
- Text style: COS
- Text height: 0.125
- Scale: Annotative

Multileaders for Existing Features

- Arrowhead size: 0.1
- Arrowhead symbol: Closed filled
- Leader type: Spline
- Text style: COS
- Text height: 0.08
- Scale: Annotative

We recommend using the MLEADER command instead of the QLEADER command for drawing leaders. Multileaders work much better than quick-leaders in most cases.

Annotative Text, Dimensions, & Multileaders

The COS & COS-Record text styles, dimension styles, and multileader styles should be set to “annotative” in AutoCAD Civil 3D. This means that you set the text size to the drawing scale factor of 1 (plotted text height) in model-space and allow AutoCAD Civil 3D to size and display the annotation based on the annotative scale set in the drawing or viewport.

For example, if you add text with a height of 0.08 in model-space and the annotative scale is set to 1”=20’, AutoCAD Civil 3D will automatically size the text to 1.6 (viewports with a scale of 1”=20’ will also display the text height as 1.6 which will then plot at 0.08 on a full-size plot).

Annotative Scale List

For scaling to work properly with XREFs, standard scale name formats must be followed. Here are two standard formats (please note that there is a space on both sides of the equal sign):

Engineering scale format: 1” = x’

Architectural scale format: x/x” = 1’-0”

Tip: AutoCAD Annotation Commands

- Use the command OBJECTSCALE to add/remove scales applied to individual text, dimensions, multileaders, or blocks.
- Use the command ANNOALLVISIBLE to show/hide annotative text, dimensions, multileaders, or blocks that do not have the current annotative scale. This allows you to easily show/hide text, dimensions, multileaders, or blocks through viewports based on scale.
- Use the command SCALELISTEDIT to add/edit annotative scales.

Table Styles

Tables (command: TABLE) may be used for the sheet index, schedules, and other tabular information. Here are a few important table style (command: TABLESTYLE) settings:

Title Cell Style

- Alignment: Middle Center
- Text style: COS
- Text height: 0.25
- Text color: Green
- No border above, to the left, and to the right.

Header Cell Style

- Alignment: Middle Left
- Text style: COS
- Text height: 0.1875
- Text color: Yellow
- Border color: Yellow (all borders)

Data Cell Style

- Alignment: [varies]
- Text style: COS
- Text height: 0.125
- Text color: Black
- Border color: Yellow (all borders)

Section 8: Plotting/Printing

Page Setups

While plotter configurations differ, here are some common settings that apply in all cases:

- Plot area: extents (do not put linework or annotation outside of title block limits)
- Drawing orientation: Landscape
- Full size plot scale: 1" = 1'; half size plot scale: 1" = 2' (always check "scale lineweights")

Plot Style Tables (pen assignments)

Standard .CTB files are provided online (see Section 2: Support Files)

COS_CADD_Standard.ctb contains the standard pen and color assignments for contract drawings and base maps:

Lineweight	Plotted Color	Color No. w/ Screening: 100	Color No. w/ Screening: 60	Color No. w/ Screening: 55
0.003	BLACK	105, 125		
0.007	BLACK	22, 65, 186		
0.01	BLACK	14, 85, 206		
0.012	BLACK	1, 226		
0.014	BLACK	7, 246		
0.014	BLACK	130		
0.02	BLACK	2, 21		145
0.024	BLACK	3, 165, 41		
0.028	BLACK	4, 61		185
0.031	BLACK	6, 81	205	
0.039	BLACK	5		
0.047	BLACK	12, 245, 121		
0.07	BLACK	53		

Record_Drawings.ctb contains the standard pen and color assignments for Record Drawings:

Lineweight	Plotted Color	Color No. w/ Screening: 100
0.01	RED	38
0.012	RED	31
0.014	RED	37
0.02	RED	32
0.024	RED	33
0.028	RED	34
0.031	RED	36
0.039	RED	35

Paperless Plotting

Creating DWFs and PDFs is an important part of our work process. Not only does it save paper, but it also allows us to electronically share drawings with people who do not have Civil 3D. The DWF format is especially powerful because it can be marked-up electronically using Autodesk Design Review.

Download it for free at: <http://www.autodesk.com/designreview-download>

Collated DWF/PDF File-Naming Convention:

- DWF: [WA #]-[project_name]-[milestone].dwf
- PDF: [WA #]-[project_name]-[milestone].pdf

(i.e. C123456-Morse_Lake_Pump_Plant-100%.dwf)

Set PUBLISHCOLLATE to 1 to make sure all sheets are included in one file.

For good quality with a reasonable file size, set the resolution to 600 dpi.

See Appendix 7 for more information on working with Autodesk Design Review.

Section 9: Electronic Transmittals

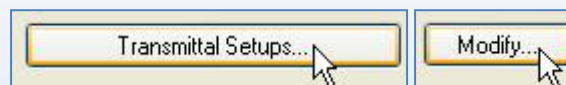
Here is an electronic transmittal checklist:

- ☐ We prefer to receive the file package in Zip format (see following page for more information)
- ☐ Make sure files follow our file naming convention (see Section 3: Project Data Sharing)
- ☐ We typically like to receive all the files in one folder (proper file naming enables us to easily sort the files in a folder)
- ☐ Include files from data links (i.e. Excel files)
- ☐ Include sheet set data and files (including .dst file, plot files, and XREFs)
- ☐ Include data shortcuts & LandXML files (you may need to manually include these files)
- ☐ Include DWF of the plan set.

Tip: Recommended eTransmit Settings

AutoCAD Civil 3D enables you to package up a set of files for Internet transmission with the eTransmit tool. Start eTransmit by opening a drawing that you would like to transmit and typing ETRANSMIT on the command line or by right clicking on a sheet set (command: SSM) and selecting eTransmit.

Click the “Transmittal Setups...” button in the “Create Transmittal” dialog box and click the “Modify...” button in the “Transmittal Setups” dialog box.



Here is an example of a preferred transmittal setup:

Transmittal type and location

Transmittal package type:
Zip (*.zip)

File format:
Keep existing drawing file formats

☐ Maintain visual fidelity for annotative objects

Transmittal file folder:
[Empty field]

Transmittal file name:
Prompt for a filename

Path options

☐ Use organized folder structure
Source root folder:
P:\Project\C103032-Morse Lake\04-Design\A-Plot_Fi

☒ Place all files in one folder

☐ Keep files and folders as is

Actions

☒ Send e-mail with transmittal

☒ Set default plotter to 'none'

☐ Bind external references

☐ Prompt for password

☐ Purge drawings

Include options

☒ Include fonts

☐ Include textures from materials

☒ Include files from data links

☐ Include photometric web files

☒ Include sheet set data and files

Email vs. FTP Transmittals

Please note that our email system typically blocks incoming emails from outside sources containing Zip files. Of course if there are a lot of large files you will not be able to send them via email. Instead you will most-likely need to upload the file package to an FTP server.

Tip: Send Files with FTP Alternatives

Autodesk 360 provides an online storage, sharing, and viewing service (up to 3GB for free):

<https://360.autodesk.com>

Google Drive allows you to send large files (starts with 5GB of free storage):

<https://drive.google.com>

Dropbox allows you to send large files (starts with 5GB of free storage): <http://dropbox.com>

Box allows you to send large files and even has an AutoCAD plug-in (starts with 5GB of free storage): <http://box.com>

Section 10: Final Product

The final product shall be:

- ☐ Plotted hard copy drawing using COS_CADD_Standard.ctb (see Section 8: Plotting/Printing) composed of black pigment-based ink on 3 mil or thicker mylar (100%, reverse read) with seal and signature affixed.
- ☐ AutoCAD .DWG files in 2012 format. Geo-referenced water, sewer, drainage, and combined sewer features (blocks and 2D linework for proposed utilities) must be “classified” (see page 56) for import into Seattle Public Utilities’ GIS system.
- ☐ AutoCAD and LandXML files of the final product (see Section 9: Electronic Transmittals) created according to the SPU/SDoT Inter-departmental CAD drafting standards.
- ☐ DWF of plan set (download free DWF writer: <http://www.autodesk.com/dwfwriter>).
- ☐ PDF of plan set (download free PDF writer: <http://www.cutepdf.com>).